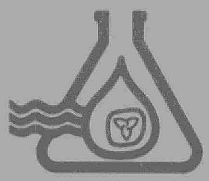

Drinking Water Surveillance Program

HAMILTON WATER TREATMENT PLANT

Annual Report 1987

Environment Ontario

Jim Bradley, Minister

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HAMILTON
WATER TREATMENT PLANT

DRINKING WATER SURVEILLANCE PROGRAM

ANNUAL REPORT 1987

ONTARIO MINISTRY OF ENVIRONMENT
OCTOBER 1988

ACKNOWLEDGEMENTS

The Drinking Water Surveillance Program (DWSP) employs a team approach requiring the co-operative effort of the Ministry of the Environment (MOE) staff from Water Resources and Laboratory Services Branch and the Regions, as well as plant operational staff from the Municipalities.

This annual report was produced by the DWSP Group (Ron Hunsinger, Peter Bohm, Carol Sackville-Duyvelshoff, Chris Fung and John McGrachan) and by Pat Lachmaniuk (on developmental assignment to the Drinking Water Section). Helpful input and reviews were received from Drinking Water Section Staff, in addition to reviews by other MOE and municipal personnel.

EXECUTIVE SUMMARY

DRINKING WATER SURVEILLANCE PROGRAM

HAMILTON WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Hamilton Water Treatment Plant is a conventional treatment plant which treats water from Lake Ontario. The process consists of coagulation, flocculation, sedimentation, filtration, disinfection and fluoridation. This plant serves a population of approximately 412,000 people and has a design capacity of 909 x 1000m3/day.

Water samples from the raw, treated and two distribution sites were taken on a monthly basis and analysed for approximately 160 parameters, 12 times during 1987. Parameters were divided into the following groups Bacteriological, Inorganic and Physical(Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed for in June and November only.

A summary of results is shown in Table 1.

Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of the water; however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were below any applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Hamilton Water Treatment Plant produced good quality water at the plant and this quality was maintained throughout the distribution system.

SOMMAIRE

PROGRAMME DE SURVEILLANCE DE L'EAU POTABLE

STATION D'ÉPURATION DE L'EAU DE HAMILTON
RAPPORT ANNUEL 1987

Le Programme de surveillance de l'eau potable (PSEP) de l'Ontario fournit des informations immédiates, fiables et à jour sur la qualité de l'eau potable. Le PSEP a débuté officiellement en avril 1986. Il est destiné à englober tous les réseaux municipaux d'alimentation en eau de l'Ontario. Actuellement, 44 stations en font partie.

La station d'épuration de Hamilton est une station classique qui traite l'eau du lac Ontario. Le traitement comporte la coagulation, la floculation, la décantation, la filtration, la désinfection et la fluoration. Cette station dessert une population d'environ 412 000 habitants et a une capacité nominale de 909 x 1 000 m3/jour.

Des prélèvements d'eau brute et d'eau traitée ainsi qu'en deux points du réseau de distribution ont été effectués chaque mois. Douze fois en 1987, ces prélèvements ont été analysés par rapport à environ 160 paramètres dans les catégories suivantes : bactériologique, inorganique et physique (analyses en laboratoire et sur place, présence de métaux) et organique (composés aromatiques chlorés, chlorophénols, pesticides et BPC, dérivés phénoliques, hydrocarbures aromatiques polynucléaires, pesticides particuliers et composés volatils). Les pesticides particuliers et les chlorophénols n'ont été analysés qu'en juin et en novembre.

Le tableau 1 résume les résultats obtenus.

En raison de la fréquence des prélèvements (un par mois), le PSEP ne permet pas d'évaluer tous les aspects de la qualité bactériologique de l'eau. Cependant, comme on le recommande dans le cadre des objectifs relatifs à la qualité de l'eau potable en Ontario, un contrôle bactériologique est effectué par l'exploitant. L'analyse bactériologique limitée du PSEP a révélé une eau de bonne qualité.

Les mesures des paramètres inorganiques et physiques (analyses en laboratoire et sur place, présence de métaux) étaient inférieures aux limites applicables fixées par l'Ontario pour l'eau potable.

Pour environ 110 paramètres organiques mesurés chaque mois, aucun résultat n'a dépassé les limites acceptables fixées pour la santé.

Un grand nombre de substances détectées apparaissent naturellement ou sont des produits dérivés de l'épuration.

Les résultats des analyses effectuées en 1987 dans le cadre du PSEP ont indiqué que la station d'épuration de Hamilton donnait une eau de bonne qualité et que cette qualité se maintenait dans tout le réseau de distribution.

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT

SUMMARY TABLE BY SCAN (1987)

		RAW			TREATED			SITE 1			SITE 2		
	SCAN	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
	BACTERIOLOGICAL	44	34	77	44	12	27	44	12	27	50	13	26
	CHEMISTRY (FLD)	38	38	100	62	62	100	101	101	100	91	91	100
	CHEMISTRY (LAB)	226	192	84	189	143	75	357	314	87	394	349	88
	METALS	241	142	58	222	117	52	431	246	57	468	264	56
	CHLOROAROMATICS	156	0	0	143	1	0	130	0	0	143	0	0
	CHLOROPHENOLS	12	0	0	6	0	0	.	.	.	.	.	.
	PAH	68	2	2	51	0	0	.	.	.	.	.	.
	PESTICIDES & PCB	298	0	0	273	0	0	251	0	0	276	0	0
	PHENOLICS	12	0	0	11	0	0	.	.	.	.	.	.
	SPECIFIC PESTICIDES	162	3	1	144	0	0	99	0	0	108	0	0
	VOLATILES	337	1	0	253	36	14	308	44	14	338	49	14
TOTAL		1594	412		1398	371		1721	717		1868	766	

NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE

A '.' INDICATES THAT NO SAMPLE WAS TAKEN

DRINKING WATER SURVEILLANCE PROGRAM

HAMILTON WATER TREATMENT PLANT
1987 ANNUAL REPORT

INTRODUCTION

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored. Appendix A contains a detailed description of the DWSP.

The DWSP program was initiated at the Hamilton Water Treatment Plant in the spring of 1986. An annual report was published for 1986 (ISBN 0-7729-2554-2).

This report contains information and results for 1987.

PLANT DESCRIPTION

The Hamilton Water Treatment Plant is a conventional treatment plant which treats water from Lake Ontario. The process consists of coagulation, flocculation, sedimentation, filtration, disinfection and fluoridation. Polyaluminum Chloride is added when necessary as a coagulant aid and Sulphur Dioxide is added

to dechlorinate. This plant serves a population of 412,000 people. It has a design capacity of 909 x 1000m3/day and daily flows ranging from 188 x 1000m3/day to 305 x 1000m3/day.

The plant location is shown in Figure 1. Plant Process details, in a block schematic, are shown in Figure 2. General plant information is presented in Table 2.

METHODS

Water samples were obtained from four DWSP approved locations;

i) Plant Raw - The water originated from the surge well prior to chlorination and was sampled through a copper line. The sample tap is located in the plant laboratory.

ii) Plant Treated - The water originated from the highlift discharge after addition of all treatment chemicals and was sampled through a copper line. The sample tap is located in the plant laboratory.

iii) Distribution System - Site 1 - This house is approximately 1 kilometer from the plant. Water was sampled through copper plumbing from the basement laundry tap.

iv) Distribution System - Site 2 - This house is approximately 14 kilometers from the plant. Water was sampled through copper plumbing from the basement laundry tap.

FIGURE 1

DRINKING WATER SURVEILLANCE PROGRAM ANNUAL REPORT

SITE LOCATION MAP

LOCATION: HAMILTON WATER TREATMENT PLANT

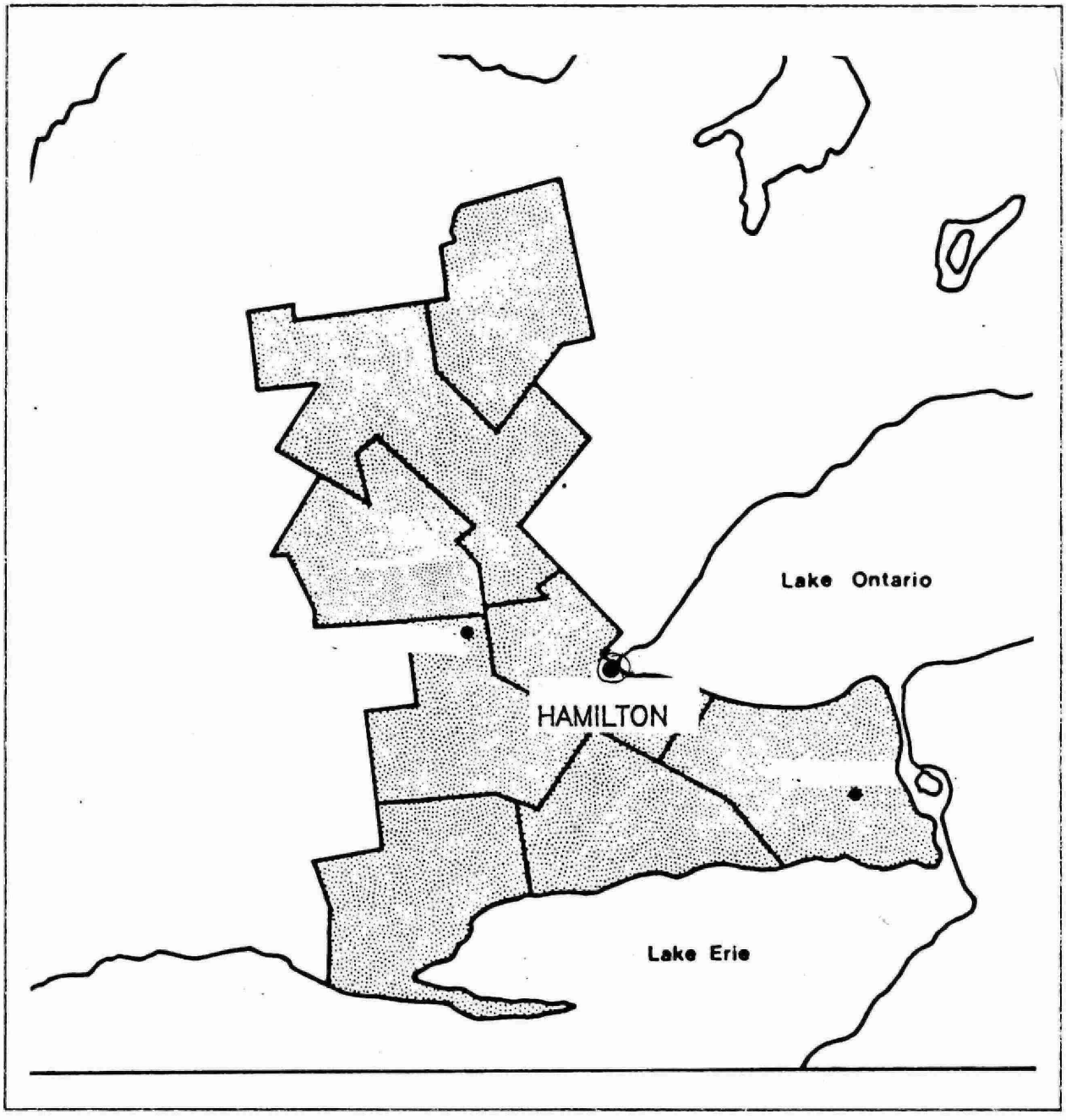
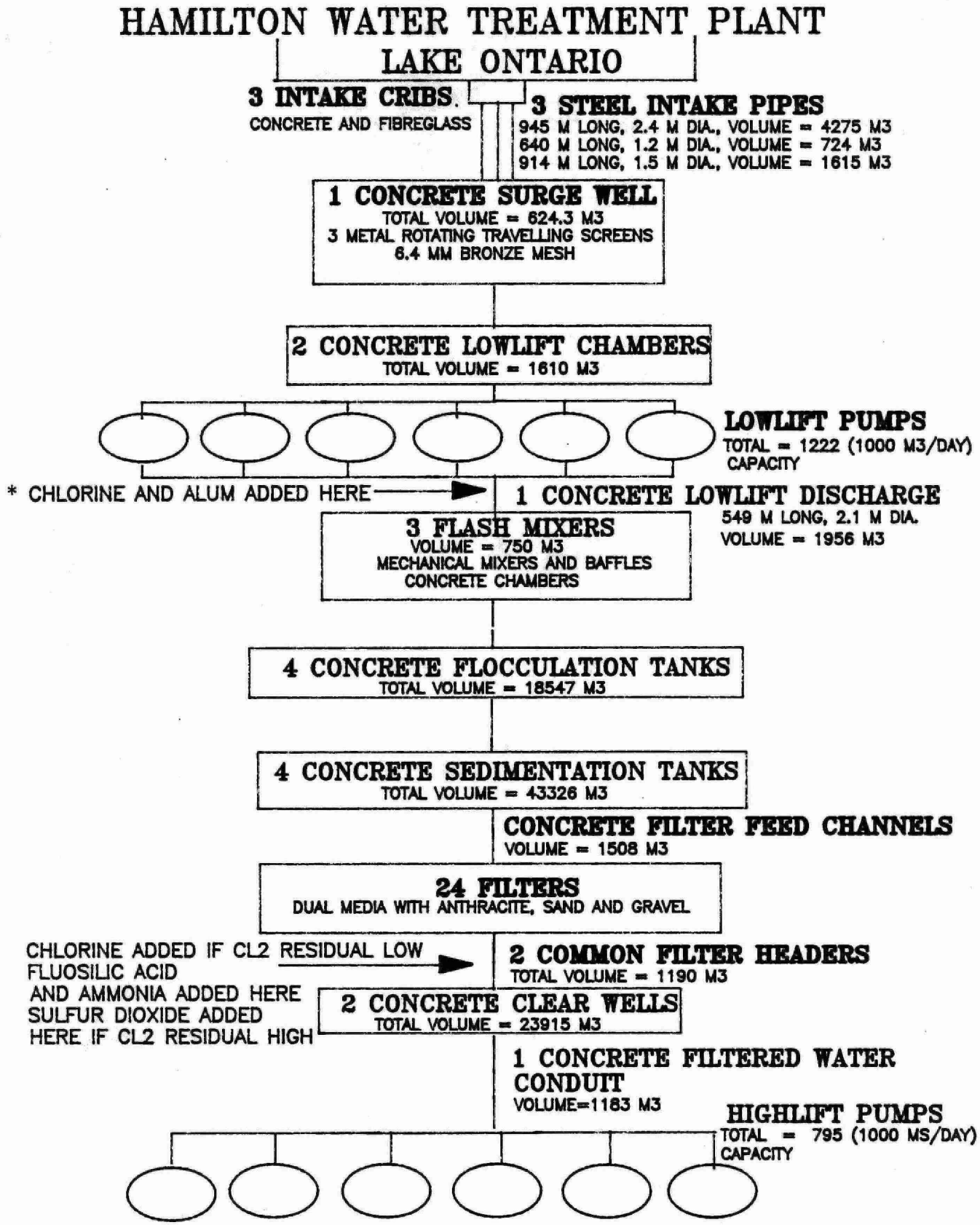


Figure 2



* Polyaluminum chloride when necessary

TABLE 2

DRINKING WATER SURVEILLANCE PROGRAM ANNUAL REPORT

GENERAL INFORMATION

HAMILTON WATER SUPPLY SYSTEM

LOCATION:	900 WOODWARD AVE HAMILTON, ONTARIO L8H 7N2 (416-526-4408)
SOURCE:	RAW WATER SOURCE - LAKE ONTARIO
RATED CAPACITY:	909 (1000 M3/DAY)
OPERATION:	MUNICIPAL
PLANT SUPERINTENDENT:	W. FURRY
MINISTRY REGION:	WEST CENTRAL
DISTRICT OFFICER:	MR. J.W. VOGT

MUNICIPALITY SERVED	POPULATION
ANCASTER	16,542
DUNDAS TOWN	20,081
HAMILTON	307,690
STONEY CREEK	41,690
WATERDOWN	25,541

Sample lines in the plant were flushed prior to sampling to ensure that the water obtained was indicative of its origin and not residual water standing in the sample line.

At both distribution system locations two types of samples were obtained: a standing and a free flow. The standing sample consisted of water that had been in the household plumbing and service connection for a minimum of six hours. These samples are used to make an assessment of the amount by which the levels of inorganic compounds and metals may be changed on standing due to leaching from (or deposition on) the plumbing system. The only analyses carried on these samples therefore, are General Chemistry and Metals. The free flow sample represented fresh water from the distribution main that had been flowing for five minutes before being sampled.

Attempts were made to capture the same block of water at each sampling point by taking the retention time into consideration. The retention time was calculated by dividing the volume of water between the two sampling points by the sample day flow. For example, if it was determined that the retention time within the plant was five hours then there would be a five hour interval between the raw and treated sampling. Similarly if it was estimated that it took approximately one day for the water to travel from the plant to the distribution system site, this site would be sampled one day after the treated water from the plant.

Stringent DWSP sampling protocols were followed to eliminate any variance. (Appendix B).

Sample day flow, treatment chemical dosages and Field Chemistry measurements were recorded on the day of sampling and were entered on the DWSP database as submitted.

RESULTS

Water at the Hamilton Water Treatment Plant was sampled for approximately 160 parameters on a monthly basis. The Specific Pesticides and Chlorophenols scans were sampled for in June and November only. Polynuclear Aromatic Hydrocarbons and Phenolics were only analysed for in the raw and treated water at the plant.

Table 3 contains information on the sample day retention time, flow rate and treatment chemicals used and their associated dosages.

Table 4 is a summary break-down of the number of water samples analysed for by parameter and by water type. The number of times that a positive or trace result was detected is also reported.

Positive denotes that the result is greater than the statistical limit of detection established by the Ministry of the Environment (MOE) laboratory staff and is quantifiable. Trace (<T) denotes that the level measured is greater than the lowest value detectable by the method but lies so close to the detection limit

that it cannot be confidently quantified.

Table 5 presents the results for parameters detected on at least one occasion.

Table 6 presents parameters not detected.

Associated guidelines and detection limits are also supplied on both tables. Parameters are listed alphabetically within each scan.

DISCUSSION

General

Water quality is judged by comparison with the Ontario Drinking Water Objectives (ODWOs) as defined in the 1984 publication (ISBN 0-7743-8985-0). The Province of Ontario has health related and aesthetic objectives for 49 parameters. These are currently under review. When an ODWO is not available guidelines/limits from other agencies are consulted. The Parameters Listing System (PALIS) recently initiated by the MOE catalogues and keeps current over 1750 guidelines for 650 parameters from agencies throughout the world.

As stated under Results, traces do not indicate quantifiable values, as defined by established MOE Laboratory analytical reporting protocols. While they can be useful in trend analysis or confirmation of a specific contaminant that is repeatedly

detected at these levels, the occasional finding of a trace level of a contaminant is not considered to be significant. **DISCUSSION OF GUIDELINES AND LIMITS THEREFORE, IS ONLY CONDUCTED ON POSITIVE RESULTS.**

Bacteriology

Positive results for the Bacteriology scan were present twelve times in the treated water, the distribution system Site 1 water and the Site 2 water. The positive parameters were Standard Plate Count, Total Coliform and/or Total Coliform Background and Presence/Absence test.

Due to its sampling frequency of once per month, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water. Routine bacteriological monitoring as recommended in the ODWO is carried out by the operating authority. Water from the Hamilton Water Treatment Plant, in terms of the limited DWSP bacteriological examination, was of good quality.

Inorganic and Physical Parameters

Laboratory and Field Chemistry

The results for Laboratory and Field Chemistry scans were below any applicable health related ODWOs.

Turbidity in water is caused by the presence of suspended matter such as clay, silt, colloidal particles, plankton and other microscopic organisms. The most important health effect of Turbidity is its interference with disinfection in the treatment plant and maintenance of a chlorine residual. The ODWO of 1 Formazin Turbidity Unit (FTU) is only applicable to treated water leaving the plant.

There are ODWOs that are set for parameters which are related to aesthetic quality rather than health; one of these is Organic Nitrogen. Organic Nitrogen values are calculated by subtracting the value for Ammonia (Ammonium Total) from the value for Total Kjeldahl Nitrogen (Nitrogen Tot Kjeld). The aesthetic ODWO of 0.15 mg/L was exceeded in many of the treated water samples and distribution system samples. When Organic Nitrogen exceeds 0.15 mg/L in treated water some taste and odour problems can result.

This guideline is exceeded in most supplies. Based on the information obtained from the DWSP, which generally indicates no problems with this parameter exceedence, the guideline may be modified when the ODWOs are reviewed.

It is desirable that the Temperature of drinking water be less than 15°C; the palatability of water is enhanced by its coolness. A temperature below 15°C will tend to reduce the growth of nuisance organisms and hence minimize associated taste, colour, odour and corrosion problems. The desired ODWO was exceeded eight times in the distributed water.

As part of the treatment plant process, fluosilic acid is added to the treated water (Table 3). Where fluoridation is practised, the fluoride concentration recommended in the ODWO is 1.2 mg/L, plus or minus 0.2 mg/L. Results indicate that the plant was rarely successful in maintaining this level.

Metals

The results reported for the Metal scan were below any applicable health related ODWOs.

Elevated levels of Cadmium, Copper, Lead and Zinc were detected in the standing samples from the distribution system as compared to the free flow samples thus, indicating that small quantities of these metals were leached from the household plumbing as the water stood overnight.

The Iron level was elevated in the September distribution system Site 2 standing water sample. High levels of Iron may impart a brownish colour to laundered goods and it may produce a bitter, astringent taste in water. Excessive Iron can also promote the growth of iron bacteria in water mains and service pipes.

At present, there is no evidence that Aluminum is physiologically harmful and no health limit has been specified. The measure of residual Aluminum in the treated water is important to indicate efficiency of the treatment process. The ODWOs indicate that a useful guideline is to maintain a residual below 0.1 mg/L as Al

in the water leaving the plant. Aluminum values frequently exceeded the ODWO operational guideline.

Mercury levels in the distribution system Site 1 sample showed an increase through the year. Over the past year in the DWSP it has been observed that potassium dichromate, used to preserve Mercury samples, has a limited shelf-life and this may result in false positives for the presence of Mercury. As the preservative deteriorates Mercury levels increase as a result of interferences and the preservative is replaced.

Organic Parameters

Chloroaromatics

Results of the Chloroaromatics scan showed five parameters were detected:

Hexachlorobutadiene

1,2,3,4-Tetrachlorobenzene

1,2,3-Trichlorobenzene

1,2,4-Trichlorobenzene

Hexachloroethane

Hexachlorobutadiene was detected at trace levels, once in the distribution system Site 1 water.

1,2,3,4-Tetrachlorobenzene was detected at trace levels, once in the distribution system Site 1 water.

1,2,3-Trichlorobenzene was detected at a trace level, once in the treated water.

1,2,4-Trichlorobenzene was detected at a trace level, once in the raw water and once in the treated water.

Hexachloroethane was detected at trace levels, five times in the treated water, four times in the distribution system Site 1 water and five times in the Site 2 water. The October treated water sample had a value of 15.0 ng/L; this level is far below the United States Environmental Protection Agency (EPA) Ambient Water Quality (AWQ) guideline of 1900 ng/L. AWQ guidelines are designed to ensure that surface water, used as a drinking water source and from which fish are consumed, does not contain substances at levels that would be hazardous to human health. Since both water and fish consumption are considered, AWQ guidelines are usually more stringent than corresponding drinking water guidelines.

Review of these results, along with information from other water supplies on DWSP, would indicate that certain Chloroaromatics appear more frequently in the treated water than in the raw and almost always only at trace levels. These occurrences could possibly be due to a reaction of chlorine with organics present in the water or the distribution system.

Chlorophenols

Results of the Chlorophenol scan showed that no Chlorophenols were detected.

Pesticides and PCB (Polychlorinated Biphenyl)

Results of the Pesticide and PCB scan showed that three pesticides were detected:

Alpha BHC

Beta BHC

Lindane

Lindane consists of several isomers of BHC (Benzene Hexachloride). Alpha BHC is the isomer predominantly found in the Great Lakes basin as indicated in results from other water supplies on DWSP.

Alpha BHC was detected at trace levels, eleven times in the raw water, ten times in the treated water, nine times in the distribution system Site 1 water and eleven times in the Site 2 water.

Beta BHC was detected once, at a trace level, in the distribution system Site 1 water.

Lindane was detected at trace levels, four times in the raw water, eight times in the treated water, eight times in the

distribution system Site 1 water and six times in the distribution system Site 2 water.

Specific Pesticides

Results of the Specific Pesticide scan showed that five parameters were detected:

Atrazine

Bladex

Prometone

Propazine

Simazine

Atrazine was detected at a trace level, once in the raw water.

Bladex was detected in the January raw water sample at 5450 ng/L. This is below the Health and Welfare Canada interim guideline for Bladex of 10,000 ng/L.

Prometone was detected in the January raw water sample at 1460 ng/L. This is below the EPA Lifetime Health Advisory of 52500 ng/L.

Propazine was detected at a trace level, once in the raw water.

Simazine was detected in the January raw water sample at 860 ng/L. This is below the Health and Welfare Canada interim guideline of 10000 ng/L.

The Bladex,Prometone and Simazine positive findings, plus the detection of trace levels of Atrazine and Propazine all occurred in the same sample which may indicate the possibility of an interference with laboratory analysis. They were not found in any treated water sample and although limits are not applicable to raw water, they are mentioned here to put the numbers in context.

Phenolics

Phenolics were detected, at trace levels, six times in the raw and six times in the treated water. Phenolic compounds are present in the aquatic environment as a result of natural and/or industrial processes.

Polynuclear Aromatic Hydrocarbons (PAH)

Results of the PAH scan showed that one PAH was detected:

Benzo (A) Pyrene

Benzo (A) Pyrene was detected in both the October and December raw water samples at 5.0 ng/L. This is below the Health and Welfare Canada interim guideline of 10.0 ng/L.

PAHs have a close association with Turbidity. Removal of Turbidity by conventional treatment will achieve maximum PAH reduction.

Volatiles

Results of the Volatile scan showed that five parameters, other than Trihalomethanes(THMs), were detected:

Benzene

Toluene

Ethylbenzene

Meta and Para-Xylene

Ortho-Xylene

Benzene was detected at a trace level, once in the treated water.

Toluene was detected at trace levels, twice in the distribution system Site 1 water and once in the distribution system Site 2 water. Two positive values were considered by laboratory analysts to be unreliable due to contamination as per the remark 'UCS'.

Ethylbenzene was detected at trace levels, once in the treated water and four times in the distribution system Site 1 water.

Meta and Para-Xylene are reported as one compound, M-Xylene and were detected at trace levels, twice in the distribution system Site 1 water.

Ortho-Xylene (O-Xylene) was detected once, at a trace level, in the distribution system Site 1 water.

These volatiles are typically found on an occasional basis at other water supplies included on the DWSP usually at trace

levels.

THMs are known to be produced during the water treatment process and will always occur in chlorinated surface waters. THMs are comprised mainly of Chloroform, Chlorodibromomethane and Dichlorobromomethane. Bromoform occurs occasionally. Results are reported for the individual compounds as well as for total THMs.

Chloroform, Chlorodibromomethane, Dichlorobromomethane and Total THMs were detected in all treated waters. Bromoform was detected at trace levels, once in the treated water, twice in the distribution system Site 1 water and three times in the Site 2 water. All THM occurrences were well below the ODWO of 350 ug/L for Total THMs.

Raw and treated water quality from 1986 to 1987 has remained consistent.

CONCLUSIONS

The Hamilton Water Treatment Plant for the sample year of 1987 produced good quality water at the plant and this was maintained throughout the distribution system.

No health related guidelines, for organic or inorganic parameters, were exceeded during 1986 and 1987.

RECOMMENDATIONS

Three recommendations can be made:

1) The data base should be reviewed in consultation with Regional, Plant and DWSP personnel to determine if sampling location, sampling frequency and the number of parameters analysed should be revised to allow for a more efficient characterization of the water.

2) The reason for elevated Aluminum levels in treated water samples should be investigated.

3) The fluoridation practice should be adjusted to ensure that the recommended fluoride levels are achieved in distributed water.

TABLE 3

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	SAMPLE DAY CONDITIONS		TREATMENT CHEMICAL DOSAGES (MG/L)					
			PRE-CHLORINATION	COAGULATION		FLUORIDATION	POST-CHLORINATION	DECHLORINATION
			CHLORINE	ALUM LIQUID	POLY ALUMINUM CHLORIDE	FLUOSILIC ACID	CHLORINE	SULPHUR DIOXIDE
DATE	RETENTION TIME(HRS)	FLOW (1000 M3)						
JAN 26	5.0	247.0	1.40	4.00	.	1.00	.	.
FEB 23	5.0	222.0	1.90	3.40	.	1.06	.15	.
MAR 23	5.0	222.0	2.70	4.00	.	.	.08	.
APR 27	2.3	206.4	.80	4.00	.	.98	.58	.
MAY 25	3.0	232.4	1.90	3.80	.	.97	.06	.
JUN 22	5.0	304.5	2.20	5.00	.	.93	.	.
JUL 27	5.0	190.9	2.50	4.00	.	1.01	.	.
AUG 24	3.0	222.5	2.70	4.40	.	1.15	.	.38
SEP 28	4.2	188.3	2.25	4.00	.	1.02	.	.
OCT 27	4.5	238.1	1.90	4.00	.	1.05	.	.
NOV 25	2.1	228.0	1.80	4.00	.	1.00	.	.
DEC 16	4.0	258.7	1.70	4.00	.30	.97	.28	.

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

		RAW WATER			TREATED WATER			SITE 1			SITE 2		
SCAN	PARAMETER	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE
BACTERIOLOGICAL	AEROMONAS SP	0	0	0	0	0	0	0	0	0	1	0	0
	COLIFORM	0	0	0	0	0	0	0	0	0	1	0	0
	ESCHERICHIA COLI BY PRESENCE/ABSENCE	0	0	0	0	0	0	0	0	0	1	0	0
	FECAL COLIFORM	0	0	0	0	0	0	0	0	0	1	0	0
	FECAL COLIFORM MEMBRANE FILTRATION	11	3	0	0	0	0	0	0	0	0	0	0
	P/A BOTTLE	0	0	0	11	0	0	11	0	0	12	1	0
	STANDARD PLATE COUNT MEMBRANE FILT.	11	11	0	11	9	0	11	9	0	11	9	0
	STAPH AUREUS	0	0	0	0	0	0	0	0	0	1	0	0
	TOTAL COLIFORM BACKGROUND MF	11	10	0	11	3	0	11	3	0	11	3	0
	TOTAL COLIFORM MEMBRANE FILTRATION	11	10	0	11	0	0	11	0	0	11	0	0
*TOTAL SCAN BACTERIOLOGICAL		44	34	0	44	12	0	44	12	0	50	13	0
*TOTAL GROUP BACTERIOLOGICAL		44	34	0	44	12	0	44	12	0	50	13	0
CHEMISTRY (FLD)	FIELD COMBINED CHLORINE RESIDUAL	0	0	0	12	12	0	21	21	0	19	19	0
	FIELD FREE CHLORINE RESIDUAL	1	1	0	2	2	0	0	0	0	3	3	0
	FIELD PH	12	12	0	12	12	0	22	22	0	24	24	0
	FIELD TEMPERATURE	12	12	0	12	12	0	22	22	0	24	24	0
	FIELD TOTAL CHLORINE RESIDUAL	1	1	0	12	12	0	22	22	0	19	19	0
	FIELD TURBIDITY	12	12	0	12	12	0	14	14	0	2	2	0
*TOTAL SCAN CHEMISTRY (FLD)		38	38	0	62	62	0	101	101	0	91	91	0
CHEMISTRY (LAB)	ALKALINITY	12	12	0	10	10	0	22	22	0	24	24	0
	AMMONIUM TOTAL	12	10	2	10	10	0	22	20	2	24	23	1

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

		RAW WATER			TREATED WATER			SITE 1			SITE 2		
SCAN	PARAMETER	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE
CHEMISTRY (LAB)	CALCIUM	12	12	0	10	10	0	22	22	0	24	24	0
	CHLORIDE	12	12	0	10	10	0	22	22	0	24	24	0
	COLOUR	12	3	9	10	0	10	22	1	20	24	2	17
	CONDUCTIVITY	12	12	0	10	10	0	22	22	0	24	24	0
	CYANIDE	10	0	0	9	0	0	9	0	0	10	0	0
	FLUORIDE	12	12	0	10	10	0	22	22	0	24	24	0
	HARDNESS	12	12	0	10	10	0	22	22	0	24	24	0
	MAGNESIUM	12	12	0	10	10	0	22	22	0	24	24	0
	NITRITE	12	8	2	10	0	7	22	11	9	24	14	10
	NITROGEN TOTAL KJELDAHL	12	12	0	10	10	0	20	20	0	24	24	0
	PH	12	12	0	10	10	0	22	22	0	24	24	0
	PHOSPHORUS FIL REACT	12	7	3	10	3	5	0	0	0	0	0	0
	PHOSPHORUS TOTAL	12	8	4	10	1	9	0	0	0	0	0	0
	SODIUM	12	12	0	10	10	0	22	22	0	24	24	0
	TOTAL NITRATES	12	12	0	10	10	0	22	22	0	24	24	0
	TOTAL SOLIDS	12	12	0	10	10	0	22	22	0	24	24	0
	TURBIDITY	12	12	0	10	9	1	20	20	0	24	22	2
*TOTAL SCAN CHEMISTRY (LAB)		226	192	20	189	143	32	357	314	31	394	349	30
METALS	ALUMINUM	12	12	0	11	11	0	22	22	0	24	23	0
	ARSENIC	12	0	0	11	0	0	22	0	0	24	0	0
	BARIUM	12	12	0	11	11	0	22	22	0	24	24	0
	BERYLLIUM	12	1	0	11	0	0	22	0	0	24	0	0
	BORON	12	5	7	11	5	6	22	10	12	24	8	15
	CADMIUM	12	2	0	11	0	0	22	3	0	24	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

		RAW WATER			TREATED WATER			SITE 1			SITE 2		
SCAN	PARAMETER	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE
METALS	CHROMIUM	12	6	0	11	6	0	22	14	0	24	14	0
	COBALT	12	2	0	11	1	0	22	0	0	24	1	0
	COPPER	12	11	0	11	7	0	22	22	0	24	24	0
	CYANIDE	2	0	0	2	0	0	2	0	0	2	0	0
	IRON	12	12	0	11	11	0	22	22	0	24	20	0
	LEAD	12	3	0	11	1	0	22	3	0	24	12	0
	MANGANESE	12	12	0	11	9	0	22	22	0	24	22	0
	MERCURY	12	11	0	11	10	0	11	11	0	12	12	0
	MOLYBDENUM	12	10	0	11	10	0	22	18	0	24	20	0
	NICKEL	12	8	0	11	5	0	22	14	0	24	12	0
	SELENIUM	12	0	0	11	0	0	22	0	0	24	0	0
	STRONTIUM	12	12	0	11	11	0	22	22	0	24	24	0
	URANIUM	11	11	0	11	11	0	22	22	0	22	21	0
	VANADIUM	12	1	0	11	0	0	22	0	0	24	6	0
	ZINC	12	11	0	11	8	0	22	19	0	24	21	0
*TOTAL SCAN METALS		241	142	7	222	117	6	431	246	12	468	264	15
*TOTAL GROUP INORGANIC & PHYSICAL		505	372	27	473	322	38	889	661	43	953	704	45
CHLOROAROMATICS	123 TRICHLOROBENZENE	12	0	0	11	0	1	10	0	0	11	0	0
	1234 TETRACHLOROBENZENE	12	0	0	11	0	0	10	0	1	11	0	0
	1235 TETRACHLOROBENZENE	12	0	0	11	0	0	10	0	0	11	0	0
	124 TRICHLOROBENZENE	12	0	1	11	0	1	10	0	0	11	0	0
	1245 TETRACHLOROBENZENE	12	0	0	11	0	0	10	0	0	11	0	0
	135 TRICHLOROBENZENE	12	0	0	11	0	0	10	0	0	11	0	0
	236 TRICHLOROTOLUENE	12	0	0	11	0	0	10	0	0	11	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

		RAW WATER			TREATED WATER			SITE 1			SITE 2		
SCAN	PARAMETER	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE
CHLOROAROMATICS	245 TRICHLOROTOLUENE	12	0	0	11	0	0	10	0	0	11	0	0
	26A TRICHLOROTOLUENE	12	0	0	11	0	0	10	0	0	11	0	0
	HEXACHLOROBUTADIENE	12	0	0	11	0	1	10	0	1	11	0	0
	HEXACHLOROETHANE	12	0	0	11	1	5	10	0	4	11	0	5
	OCTACHLOROSTYRENE	12	0	0	11	0	0	10	0	0	11	0	0
	PENTACHLOROBENZENE	12	0	0	11	0	0	10	0	0	11	0	0
*TOTAL SCAN CHLOROAROMATICS		156	0	1	143	1	8	130	0	6	143	0	5
CHLOROPHENOLS	234 TRICHLOROPHENOL	2	0	0	1	0	0	0	0	0	0	0	0
	2345 TETRACHLOROPHENOL	2	0	0	1	0	0	0	0	0	0	0	0
	2356 TETRACHLOROPHENOL	2	0	0	1	0	0	0	0	0	0	0	0
	245-TRICHLOROPHENOL	2	0	0	1	0	0	0	0	0	0	0	0
	246-TRICHLOROPHENOL	2	0	0	1	0	0	0	0	0	0	0	0
	PENTACHLOROPHENOL	2	0	0	1	0	0	0	0	0	0	0	0
*TOTAL SCAN CHLOROPHENOLS		12	0	0	6	0	0	0	0	0	0	0	0
PAH	ANTHANTHRENE	0	0	0	0	0	0	0	0	0	0	0	0
	ANTHRACENE	4	0	0	3	0	0	0	0	0	0	0	0
	BENZO(A) ANTHRACENE	4	0	0	3	0	0	0	0	0	0	0	0
	BENZO (A) PYRENE	4	2	0	3	0	0	0	0	0	0	0	0
	BENZO(B) CHRYSENE	4	0	0	3	0	0	0	0	0	0	0	0
	BENZO(B) FLUORANTHENE	4	0	0	3	0	0	0	0	0	0	0	0
	BENZO(E)PYRENE	4	0	0	3	0	0	0	0	0	0	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

		RAW WATER			TREATED WATER			SITE 1			SITE 2		
SCAN	PARAMETER	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE
PAH	BENZO(G,H,I) PERYLENE	4	0	0	3	0	0	0	0	0	0	0	0
	BENZO(J) FLUORANTHENE	0	0	0	0	0	0	0	0	0	0	0	0
	BENZO(K) FLUORANTHENE	4	0	0	3	0	0	0	0	0	0	0	0
	CHRYSENE	4	0	0	3	0	0	0	0	0	0	0	0
	CORONENE	4	0	0	3	0	0	0	0	0	0	0	0
	DIBENZO(A,H) ANTHRACENE	4	0	0	3	0	0	0	0	0	0	0	0
	DIMETHYL BENZO(A) ANTHRACENE	4	0	0	3	0	0	0	0	0	0	0	0
	FLUORANTHENE	4	0	0	3	0	0	0	0	0	0	0	0
	INDENO(1,2,3-C,D) PYRENE	4	0	0	3	0	0	0	0	0	0	0	0
	PERYLENE	4	0	0	3	0	0	0	0	0	0	0	0
	PHENANTHRENE	4	0	0	3	0	0	0	0	0	0	0	0
	PYRENE	4	0	0	3	0	0	0	0	0	0	0	0
*TOTAL SCAN PAH		68	2	0	51	0	0	0	0	0	0	0	0
PESTICIDES & PCB	ALACHLOR	12	0	0	12	0	0	11	0	0	12	0	0
	ALDRIN	12	0	0	11	0	0	10	0	0	11	0	0
	ALPHA BHC	12	0	11	11	0	10	10	0	9	11	0	11
	ALPHA CHLORDANE	12	0	0	11	0	0	10	0	0	11	0	0
	ATRATONE	12	0	0	12	0	0	11	0	0	12	0	0
	BETA BHC	12	0	0	11	0	0	10	0	1	11	0	0
	DIELDRIN	12	0	0	11	0	0	10	0	0	11	0	0
	ENDRIN	12	0	0	11	0	0	10	0	0	11	0	0
	ETHLYENE DIBROMIDE	10	0	0	7	0	0	9	0	0	10	0	0
	GAMMA CHLORDANE	12	0	0	11	0	0	10	0	0	11	0	0
	HEPTACHLOR	12	0	0	11	0	0	10	0	0	11	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

		RAW WATER			TREATED WATER			SITE 1			SITE 2		
SCAN	PARAMETER	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE
PESTICIDES & PCB	HEPTACHLOR EPOXIDE	12	0	0	11	0	0	10	0	0	11	0	0
	HEXACHLOROBENZENE	12	0	0	11	0	0	10	0	0	11	0	0
	LINDANE	12	0	4	11	0	8	10	0	8	11	0	6
	METHOXYCHLOR	12	0	0	11	0	0	10	0	0	11	0	0
	MIREX	12	0	0	11	0	0	10	0	0	11	0	0
	O,P-DDT	12	0	0	11	0	0	10	0	0	11	0	0
	OXYCHLORDANE	12	0	0	11	0	0	10	0	0	11	0	0
	PCB	12	0	0	11	0	0	10	0	0	11	0	0
	PP-DDD	12	0	0	11	0	0	10	0	0	11	0	0
	PPDDE	12	0	0	11	0	0	10	0	0	11	0	0
	PPDDT	12	0	0	11	0	0	10	0	0	11	0	0
	THIODAN I	12	0	0	11	0	0	10	0	0	11	0	0
	THIODAN II	12	0	0	11	0	0	10	0	0	11	0	0
	THIODAN SULPHATE	12	0	0	11	0	0	10	0	0	11	0	0
*TOTAL SCAN PESTICIDES & PCB		298	0	15	273	0	18	251	0	18	276	0	17
PHENOLICS		12	0	6	11	0	6	0	0	0	0	0	0
*TOTAL SCAN PHENOLICS		12	0	6	11	0	6	0	0	0	0	0	0
SPECIFIC PESTICIDES		2	0	0	2	0	0	0	0	0	0	0	0
	2,4 D PROPIONIC ACID	2	0	0	1	0	0	0	0	0	0	0	0
	2,4,5-T	2	0	0	1	0	0	0	0	0	0	0	0
	2,4-D	2	0	0	1	0	0	0	0	0	0	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

		RAW WATER			TREATED WATER			SITE 1			SITE 2		
SCAN	PARAMETER	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE
SPECIFIC PESTICIDES	24-DICHLORORPHENOXYBUTYRIC	2	0	0	1	0	0	0	0	0	0	0	0
	AMETRYNE	12	0	0	12	0	0	11	0	0	12	0	0
	AMINOCARB	0	0	0	0	0	0	0	0	0	0	0	0
	ATRAZINE	12	0	1	12	0	0	11	0	0	12	0	0
	BENOMYL	0	0	0	0	0	0	0	0	0	0	0	0
	BLADEX	12	1	0	12	0	0	11	0	0	12	0	0
	BUX (METALKAMATE)	2	0	0	2	0	0	0	0	0	0	0	0
	CARBOFURAN	2	0	0	2	0	0	0	0	0	0	0	0
	DIALLATE	2	0	0	2	0	0	0	0	0	0	0	0
	DIAZINON	2	0	0	1	0	0	0	0	0	0	0	0
	DICAMBA	2	0	0	1	0	0	0	0	0	0	0	0
	DICHLOROVOS	2	0	0	1	0	0	0	0	0	0	0	0
	DURSBAN	2	0	0	1	0	0	0	0	0	0	0	0
	EPTAM	2	0	0	2	0	0	0	0	0	0	0	0
	ETHION	2	0	0	1	0	0	0	0	0	0	0	0
	GUTHION	0	0	0	0	0	0	0	0	0	0	0	0
	IPC	2	0	0	2	0	0	0	0	0	0	0	0
	MALATHION	2	0	0	1	0	0	0	0	0	0	0	0
	METHYL PARATHION	2	0	0	1	0	0	0	0	0	0	0	0
	METHYLTRITHION	2	0	0	1	0	0	0	0	0	0	0	0
	METOLACHLOR	12	0	0	12	0	0	11	0	0	12	0	0
	MEVINPHOS	2	0	0	1	0	0	0	0	0	0	0	0
	PARATHION	2	0	0	1	0	0	0	0	0	0	0	0
	PHORATE (THIMET)	2	0	0	1	0	0	0	0	0	0	0	0
	PICHLORAM	0	0	0	0	0	0	0	0	0	0	0	0
	PROMETONE	12	1	0	12	0	0	11	0	0	12	0	0
	PROMETRYNE	12	0	0	12	0	0	11	0	0	12	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

		RAW WATER			TREATED WATER			SITE 1			SITE 2		
SCAN	PARAMETER	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE
SPECIFIC PESTICIDES	PROPAZINE	12	0	1	12	0	0	11	0	0	12	0	0
	PROPOXUR	2	0	0	2	0	0	0	0	0	0	0	0
	RELDAN	2	0	0	1	0	0	0	0	0	0	0	0
	RONNEL	2	0	0	1	0	0	0	0	0	0	0	0
	SENCOR	12	0	0	12	0	0	11	0	0	12	0	0
	SEVIN (CARBARYL)	2	0	0	2	0	0	0	0	0	0	0	0
	SILVEX	2	0	0	1	0	0	0	0	0	0	0	0
	SIMAZINE	12	1	0	12	0	0	11	0	0	12	0	0
	SUTAN (BUTYLATE)	2	0	0	2	0	0	0	0	0	0	0	0
	TOXAPHENE	0	0	0	0	0	0	0	0	0	0	0	0
*TOTAL SCAN SPECIFIC PESTICIDES		162	3	2	144	0	0	99	0	0	108	0	0
VOLATILES	1,1 DICHLOROETHANE	12	0	0	9	0	0	11	0	0	12	0	0
	1,1 DICHLOROETHYLENE	12	0	0	9	0	0	11	0	0	12	0	0
	1,2 DICHLOROBENZENE	12	0	0	9	0	0	11	0	0	12	0	0
	1,2 DICHLOROETHANE	12	0	0	9	0	0	11	0	0	12	0	0
	1,2 DICHLOROPROPANE	12	0	0	9	0	0	11	0	0	12	0	0
	1,3 DICHLOROBENZENE	12	0	0	9	0	0	11	0	0	12	0	0
	1,4 DICHLOROBENZENE	12	0	0	9	0	0	11	0	0	12	0	0
	111, TRICHLOROETHANE	12	0	0	9	0	0	11	0	0	12	0	0
	112 TRICHLOROETHANE	12	0	0	9	0	0	11	0	0	12	0	0
	1122 TETRA-CHLOROETHANE	12	0	0	9	0	0	11	0	0	12	0	0
	BENZENE	12	0	0	9	0	0	11	0	1	12	0	0
	BROMOFORM	12	0	0	9	0	1	11	0	2	12	0	3
	CARBON TETRACHLORIDE	12	0	0	9	0	0	11	0	0	12	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

		RAW WATER			TREATED WATER			SITE 1			SITE 2		
SCAN	PARAMETER	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE	# ANALYSED	POSITIVE	TRACE
VOLATILES	CHLOROBENZENE	12	0	0	9	0	0	11	0	0	12	0	0
	CHLORODIBROMOMETHANE	12	0	0	9	9	0	11	11	0	12	12	0
	CHLOROFORM	12	0	0	9	9	0	11	11	0	12	12	0
	DICHLOROBROMOMETHANE	12	0	0	9	9	0	11	11	0	12	12	0
	ETHLYENE DIBROMIDE	2	0	0	2	0	0	2	0	0	2	0	0
	ETHYLBENZENE	12	0	0	9	0	1	11	0	4	12	0	0
	M-XYLENE	12	0	0	9	0	0	11	0	2	12	0	0
	METHYLENE CHLORIDE	11	0	0	8	0	0	9	0	0	12	0	0
	O-XYLENE	12	0	0	9	0	0	11	0	1	12	0	0
	P-XYLENE	12	0	0	9	0	0	11	0	0	12	0	0
	TETRACHLOROETHYLENE	12	0	0	9	0	0	11	0	0	12	0	0
	TOLUENE	12	1	0	9	0	0	11	0	2	12	1	1
	TOTAL TRIHALOMETHANES	12	0	0	9	9	0	11	11	0	12	12	0
	TRANS 1,2 DICHLOROETHYLENE	12	0	0	9	0	0	11	0	0	12	0	0
	TRICHLOROETHYLENE	12	0	0	9	0	0	11	0	0	12	0	0
	TRIFLUOROCHLOROTOLUENE	12	0	0	9	0	0	11	0	0	12	0	0
*TOTAL SCAN VOLATILES		337	1	0	253	36	2	308	44	12	338	49	4
*TOTAL GROUP ORGANIC		1045	6	24	881	37	34	788	44	36	865	49	26
TOTAL		1594	412	51	1398	371	72	1721	717	79	1868	766	71

KEY TO TABLES 5 AND 6

A ONTARIO DRINKING WATER OBJECTIVES
1. Maximum Acceptable Concentration (MAC)
1+. MAC for Total Trihalomethanes
1*. MAC for Bacteriological Analyses
Poor water quality is indicated when :
- total coliform counts > 0 < 5
- P/A Bottle Test is present after 48 hours
- Aeromonas organisms are detected in more than 25% of samples in a single submission or in successive submissions from the same sampling site
- Pseudomonas Aeruginosa, Staphylococcus Aureus and members of the Fecal Streptococcus group should not be detected in any sample
- Standard Plate Count should not exceed 500 organisms per ml at 35 deg C within 48 hours

2. Interim Maximum Acceptable Concentration (IMAC)
3. Maximum Desirable Concentration (MDC)
4. Aesthetic or Recommended Operational Guideline
- hardness levels between 80 and 100 mg/L as calcium carbonate are considered to provide an acceptable balance between corrosion and incrustation, water supplies with a hardness >200 mg/L are considered poor and those in excess of 500 mg/L are unacceptable.

B HEALTH & WELFARE CANADA
1. Maximum Acceptable Concentration (MAC)
2. Proposed MAC
3. Interim MAC

C WORLD HEALTH ORGANIZATION
1. Guideline Value (GV)
2. Tentative GV
3. Aesthetic GV

D US ENVIRONMENTAL PROTECTION AGENCY (EPA)
1. Maximum Contaminant Level (MCL)
2. Suggested No-Adverse Effect Level (SNAEL)
3. Lifetime Health Advisory
4. EPA Ambient Water Quality Criteria

F EUROPEAN ECONOMIC COMMUNITY (EEC)
1. Health Related Guideline Level
2. Aesthetic Guideline Level
3. Maximum Admissable Concentration (MADC)

G CALIFORNIA STATE DEPARTMENT OF HEALTH-GUIDELINE VALUE

H USSR MAXIMUM PERMISSIBLE CONCENTRATION

I NEW YORK STATE AMBIENT WATER GUIDELINE

LABORATORY RESULTS, REMARK DESCRIPTIONS

.	No Sample Taken
BDL	Below Minimum Measurable Amount
<T	Greater Than Detection Limit But Not Confident
>	Results Are Greater Than The Upper Limit
<=>	Approximate Result
!AW	No Data: Analysis Withdrawn
!CR	No Data: Could Not Confirm By Reanalysis
!CS	No Data: Contamination Suspected
!IL	No Data: Sample Incorrectly Labelled
!IS	No Data: Insufficient Sample
!LA	No Data: Laboratory Accident
!LD	No Data: Test Queued After Sample Discarded
!NA	No Data: No Authorization To Perform Reanalysis
!NP	No Data: No Procedure
!NR	No Data: Sample Not Received
!OP	No Data: Obscured Plate
!PE	No Data: Procedural Error - Sample Discarded
!PH	No Data: Sample pH Outside Valid Range
!RO	No Data: See Attached Report (no numeric results)
!SM	No Data: Sample Missing
!SS	No Data: Send Separate Sample Properly Preserved
!UI	No Data: Indeterminant Interference
A3C	Approximate, Total Count Exceeded 300 Colonies
APL	Additional Peak, Large, Not Priority Pollutant
APS	Additional Peak, Less Than, Not Priority Pollutant
CIC	Possible Contamination, Improper Cap
CRO	Calculated Result Only
PPS	Test Performed On Preserved Sample

RMP	P and M-Xylene Not Separated
RRV	Rerun Verification
RVU	Reported Value Unusual
SPS	Several Peaks, Small, Not Priority Pollutant
UAL	Unreliable: Sample Age Exceeds Normal Limit
UCR	Unreliable: Could Not Confirm By Reanalysis
UCS	Unreliable: Contamination Suspected
UIN	Unreliable: Indeterminant Interference
XP	Positive After X Number of Hours

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
BACTERIOLOGICAL						
AEROMONAS SP (0=ABSENT)			DET'N LIMIT = N/A	GUIDELINE = 0 (A1)		
MAR	.	.	.	.	.	0
E. COLI (P/A) (0=ABSENT)			DET'N LIMIT = N/A	GUIDELINE =		
MAR	.	.	.	.	.	0
FECAL COLIFORM MF (CT/100ML)			DET'N LIMIT = 0	GUIDELINE = 0 (A1)		
JAN	0	.	.	.	.	.
FEB	0	.	.	.	.	.
MAR	0	.	.	.	.	.
APR	0	.	.	.	.	.
MAY	0	.	.	.	.	.
JUN	0	.	.	.	.	.
JUL	0	.	.	.	.	.
AUG	0	.	.	.	.	.
SEP	2	.	.	.	.	.
OCT	1	.	.	.	.	.
DEC	6	.	.	.	.	.
FECAL COLIFORM (0=ABSENT)			DET'N LIMIT = N/A	GUIDELINE = 0 (A1)		
MAR	.	.	.	.	.	0
STANDRD PLATE CNT MF (CT/ML)			DET'N LIMIT = 0	GUIDELINE = 500/ML (A1)		
JAN	45	4	.	4	.	0
FEB	32	0	.	1	.	5
MAR	101	4	.	11	.	38
APR	19	1	.	2	.	!LA
MAY	420	16	.	12	.	1
JUN	91	4	.	5	.	1
JUL	90	6	.	0	.	2
AUG	2400 >	2	.	12	.	4
SEP	440	13	.	3	.	0
OCT	740	0	.	4	.	2
NOV	.	.	.	.	.	2
DEC	410	29	.	0	.	3
P/A BOTTLE (0=ABSENT)			DET'N LIMIT = 0	GUIDELINE = 0 (A1*)		
JAN	.	0	.	0	.	0
FEB	.	0	.	0	.	0
MAR	.	0	.	0	.	1
APR	.	0	.	0	.	0

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
SITE TYPE	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
MAY	.	0	.	0	.	0
JUN	.	0	.	0	.	0
JUL	.	0	.	0	.	0
AUG	.	0	.	0	.	0
SEP	.	0	.	0	.	0
OCT	.	0	.	0	.	0
NOV	.	.	.	.	.	0
DEC	.	0	.	0	.	0
STAPH AUREUS (0=ABSENT)			DET'N LIMIT = N/A		GUIDELINE = 0 (A1)	
MAR	.	.	.	.	.	0
COLIFORM (0=ABSENT)			DET'N LIMIT = N/A		GUIDELINE = 0 (A1)	
MAR	.	.	.	.	.	0
TOTAL COLIFORM MF (CT/100ML)			DET'N LIMIT = 0		GUIDELINE = 5/100ML(A1)	
JAN	7	0	.	0	.	0
FEB	2	0	.	0	.	0
MAR	2 A3C	0	.	0	.	0
APR	0	0	.	0	.	!LA
MAY	24	0	.	0	.	0
JUN	8 A3C	0	.	0	.	0
JUL	6 A3C	0	.	0	.	0
AUG	30 A3C	0	.	0	.	0
SEP	14 A3C	0	.	0	.	0
OCT	102 A3C	0	.	0	.	0
NOV	.	.	.	.	.	0
DEC	35	0	.	0	.	0
T COLIFORM BCKGRD MF (CT/100ML)			DET'N LIMIT = 0		GUIDELINE = N/A	
JAN	33	0	.	0	.	0
FEB	8	0	.	0	.	0
MAR	350	1	.	0	.	1
APR	0	0	.	0	.	!LA
MAY	200	0	.	1	.	0
JUN	340	0	.	1	.	0
JUL	1000	0	.	0	.	1
AUG	800	1	.	0	.	0
SEP	940	0	.	0	.	4
OCT	230	0	.	0	.	0
NOV	.	.	.	.	.	0
DEC	139	1	.	5	.	0

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
SITE						
	RAW	TREATED	SITE 1		SITE 2	
TYPE						
			STANDING	FREE FLOW	STANDING	FREE FLOW
CHEMISTRY (FLD)						
FLD CHLORINE (COMB) (MG/L)			DET'N LIMIT = N/A		GUIDELINE =	N/A
JAN	.	.970	.700	.930	.300	.500
FEB	.	.850	.900	1.100	.500	.700
MAR	.	.800	.700	.900	.300	.500
APR	.	.780	.500	.500	.	.300
MAY	.	.600	.500	.500	.100	.500
JUN	.	.890	.700	.900	.300	.500
JUL	.	.790	.700	.700	.	.300
AUG	.	.660	.300	.300	.300	.300
SEP	.	.930	.300	.	.300	.500
OCT	.	.910	.100	.900	.	.500
NOV	.	1.100	.	.	.	.500
DEC	.	.870	1.000	.900	.	.700
FLD CHLORINE FREE (MG/L)			DET'N LIMIT = N/A		GUIDELINE =	N/A
JAN	.	.	.	.	.100	.100
MAR	.	.	.	.	.	.100
MAY	.	.050	.	.	.	.
AUG	.	.080	.	.	.	.
NOV	.020	.	.	.	.	.
TOTAL CHLORINE (MG/L)			DET'N LIMIT = N/A		GUIDELINE =	N/A
JAN	.	.970	.700	.930	.400	.600
FEB	.	.850	.900	1.100	.500	.700
MAR	.	.800	.700	.900	.300	.600
APR	.	.780	.500	.500	.	.300
MAY	.	.650	.500	.500	.100	.500
JUN	.	.890	.700	.900	.300	.500
JUL	.	.790	.700	.700	.	.300
AUG	.	.740	.300	.300	.300	.300
SEP	.	.930	.300	.500	.300	.500
OCT	.	.910	.100	.900	.	.500
NOV	.020	1.100	.	.	.	.500
DEC	.	.870	1.000	.900	.	.700
FLD PH (DMSNLESS)			DET'N LIMIT = N/A		GUIDELINE = 6.5-8.5 (A4)	
JAN	7.730	7.350	7.600	7.800	7.800	7.600
FEB	7.930	7.550	7.600	7.800	7.600	7.600
MAR	7.800	7.290	7.600	7.600	7.600	7.600
APR	7.500	7.200	7.600	7.600	7.600	7.600
MAY	8.150	7.300	7.600	7.600	7.400	7.400
JUN	7.350	7.200	7.800	7.800	7.400	7.400
JUL	7.700	7.700	7.600	7.600	7.200	7.400

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
SITE			SITE 1		SITE 2	
TYPE	RAW	TREATED	STANDING	FREE FLOW	STANDING	FREE FLOW
AUG	7.400	7.000	7.400	7.400	7.400	7.400
SEP	7.600	7.600	7.600	7.600	7.400	7.600
OCT	7.550	7.200	7.600	7.600	7.400	7.600
NOV	7.700	7.400	.	.	7.400	7.600
DEC	7.500	7.100	7.600	7.600	7.400	7.800
TEMPERATURE (DEG.C)			DET'N LIMIT = N/A		GUIDELINE =	N/A
JAN	2.000	2.000	6.000	4.000	21.000	7.000
FEB	2.000	2.000	6.000	4.000	10.000	8.000
MAR	4.000	4.000	6.000	6.000	20.000	6.000
APR	8.000	8.000	11.000	10.000	20.000	10.000
MAY	11.000	11.000	15.000	14.000	19.000	13.000
JUN	18.000	19.000	20.000	18.000	22.000	16.000
JUL	10.000	9.000	20.000	17.000	23.000	17.000
AUG	13.000	16.000	21.000	19.000	22.000	18.000
SEP	19.000	18.000	20.000	20.000	2.000	18.000
OCT	7.000	7.000	14.000	12.000	19.000	14.000
NOV	7.000	7.000	.	.	19.000	12.000
DEC	6.000	6.000	9.000	8.000	19.000	9.000
FLD TURBIDITY (FTU)			DET'N LIMIT = N/A		GUIDELINE = 1.0	(A1)
JAN	1.800	.240	.240	.240	.190	.190
FEB	1.400	.240	.200	.200	.	.
MAR	2.300	.350	.460	.460	.	.
APR	1.500	.220	.	.	.	.
MAY	1.400	.280	.300	.310	.	.
JUN	1.400	.350	.420	.420	.	.
JUL	.160	.220	.260	.230	.	.
AUG	2.300	.150	.	.	.	.
SEP	1.400	.210	.	.	.	.
OCT	1.100	.170	.120	.120	.	.
NOV	.600	.180	.	.	.	.
DEC	1.300	.230	.	.	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
SITE						
	RAW	TREATED	SITE 1		SITE 2	
TYPE			STANDING	FREE FLOW	STANDING	FREE FLOW
CHEMISTRY (LAB)						
ALKALINITY (MG/L)			DET'N LIMIT = .200		GUIDELINE = 30-500 (A4)	
JAN	99.100	93.600	93.300	95.100	95.800	94.300
FEB	101.000	96.200	96.200	95.500	98.600	97.400
MAR	104.200	100.100	98.800	98.700	97.600	97.700
APR	101.700	95.100	101.900	100.300	103.200	103.000
MAY	100.200	94.500	94.500	94.500	95.700	98.300
JUN	95.000	!RE	88.800	88.700	95.000	95.500
JUL	101.700	94.700	94.800	94.700	95.600	95.300
AUG	100.400	93.100	95.500	93.900	98.700	95.500
SEP	95.400	89.700	89.600	89.600	91.600	93.200
OCT	101.200	95.500	95.400	95.300	97.800	97.200
NOV	98.800	!SM	.	.	94.700	94.600
DEC	101.500	97.000	97.300	97.200	97.600	97.900
CALCIUM (MG/L)			DET'N LIMIT = .100		GUIDELINE = 100. (F2)	
JAN	39.700	39.700	40.300	40.300	40.000	39.600
FEB	40.800	41.300	41.000	41.200	42.100	41.900
MAR	41.900	41.200	41.200	41.500	41.700	41.900
APR	39.800	39.400	39.200	40.400	40.100	41.900
MAY	40.000	39.800	39.800	39.600	41.000	40.800
JUN	39.400	!RE	40.400	41.000	40.400	41.000
JUL	39.800	39.400	39.400	40.000	40.600	40.600
AUG	41.000	42.000	42.000	41.400	42.600	42.200
SEP	37.400	37.400	37.600	37.800	39.200	39.800
OCT	39.600	40.000	40.400	39.800	41.200	40.400
NOV	41.800	!SM	.	.	40.600	41.200
DEC	38.800	39.700	39.800	38.600	41.000	41.000
CHLORIDE (MG/L)			DET'N LIMIT = .200		GUIDELINE = 250.0 (A3)	
JAN	25.000	26.500	28.000	26.500	27.500	27.500
FEB	27.500	29.500	30.000	29.500	30.000	30.000
MAR	27.000	29.500	30.500	29.000	29.500	29.000
APR	28.000	31.500	31.500	31.000	31.500	32.500
MAY	26.500	28.500	29.500	29.000	29.000	28.500
JUN	25.500	!RE	28.500	28.000	30.000	30.000
JUL	25.000	27.000	27.000	26.500	27.000	27.000
AUG	25.000	28.000	29.000	28.000	27.000	26.500
SEP	22.500	25.000	25.500	25.000	25.000	25.000
OCT	24.900	26.100	26.700	26.700	26.700	26.300
NOV	23.900	!SM	.	.	26.300	26.000
DEC	24.200	25.800	26.000	26.200	25.900	25.800
COLOUR (TCU)			DET'N LIMIT = .5		GUIDELINE = 5.0 (A3)	
JAN	2.500 <T	1.500 <T	2.500 <T	1.500 <T	1.500 <T	1.000 <T

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
SITE						
	RAW	TREATED	SITE 1		SITE 2	
TYPE			STANDING	FREE FLOW	STANDING	FREE FLOW
FEB	1.000 <T	1.000 <T	1.500 <T	1.000 <T	1.500 <T	2.000 <T
MAR	3.500	2.000 <T	3.000	2.500 <T	1.500 <T	1.000 <T
APR	2.000 <T	1.000 <T	1.500 <T	2.000 <T	1.000	1.000
MAY	3.000	1.500 <T	2.000 <T	2.500 <T	1.500 <T	1.000 <T
JUN	1.000 <T	!RE	.500 <T	BDL	BDL	BDL
JUL	3.000	1.000 <T	2.000 <T	1.500 <T	1.000 <T	1.000 <T
AUG	1.500 <T	.500 <T	1.500 <T	1.500 <T	BDL	.500 <T
SEP	1.500 <T	.500 <T	2.000 <T	1.500 <T	BDL	1.000 <T
OCT	1.500 <T	.500 <T	1.000 <T	1.500 <T	.500 <T	1.000 <T
NOV	2.000 <T	!SM	.	.	.500 <T	1.000 <T
DEC	2.000 <T	1.000 <T	1.500 <T	2.000 <T	BDL	.500 <T
CONDUCTIVITY (UMHO/CM)			DET'N LIMIT = 1		GUIDELINE = 400. (F2)	
JAN	329	333	342	333	339	339
FEB	331	336	341	337	340	339
MAR	352	357	360	355	360	361
APR	344	351	355	349	356	356
MAY	339	348	351	348	351	352
JUN	317	!RE	330	326	348	349
JUL	334	336	337	335	338	338
AUG	337	347	354	347	341	340
SEP	309	314	317	316	323	321
OCT	334	334	334	333	335	334
NOV	320	!SM	.	.	329	329
DEC	329	332	335	334	335	338
FLUORIDE (MG/L)			DET'N LIMIT = .01		GUIDELINE = 2.400 (A1)	
JAN	.140	.700	.850	.890	.840	.840
FEB	.140	.430	.890	.980	.990	1.000
MAR	.190	.200	.480	.440	.730	.740
APR	.140	.900	.940	.940	.890	.870
MAY	.150	.920	.890	.900	.920	.920
JUN	.140	!RE	.980	.950	.980	.950
JUL	.190	.950	.990	1.010	1.060	1.070
AUG	.150	1.280	1.110	1.110	1.010	.980
SEP	.160	.760	.980	.980	1.000	.980
OCT	.140	.980	.880	.880	.700	.680
NOV	.120	!SM	.	.	.840	.860
DEC	.140	.700	.880	.880	.880	.880
HARDNESS (MG/L)			DET'N LIMIT = .500		GUIDELINE = 80-100 (A4)	
JAN	133.000	133.000	134.500	133.500	133.500	132.500
FEB	136.500	138.000	137.000	138.000	140.500	139.500
MAR	139.500	138.000	138.000	139.000	139.000	139.000

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
SITE						
	RAW	TREATED	SITE 1		SITE 2	
TYPE						
			STANDING	FREE FLOW	STANDING	FREE FLOW
APR	135.500	134.500	134.000	137.000	135.500	141.000
MAY	134.000	134.000	134.000	133.000	137.000	137.000
JUN	133.000	!RE	134.000	136.000	135.000	137.000
JUL	134.000	133.000	133.000	134.000	135.000	136.000
AUG	138.000	140.000	140.000	139.000	141.000	140.000
SEP	127.000	127.000	128.000	128.000	131.000	133.000
OCT	134.000	135.000	136.000	134.000	138.000	136.000
NOV	142.000	!SM	.	.	136.000	139.000
DEC	132.000	134.000	135.000	131.000	138.000	137.000
MAGNESIUM (MG/L)			DET'N LIMIT = .050		GUIDELINE = 30. (F2)	
JAN	8.250	8.200	8.200	8.050	8.150	8.150
FEB	8.400	8.500	8.400	8.500	8.500	8.500
MAR	8.500	8.500	8.500	8.600	8.400	8.300
APR	8.800	8.700	8.700	8.800	8.600	8.800
MAY	8.300	8.400	8.300	8.400	8.400	8.500
JUN	8.400	!RE	8.000	8.100	8.400	8.400
JUL	8.500	8.300	8.300	8.200	8.200	8.300
AUG	8.600	8.600	8.500	8.600	8.400	8.300
SEP	8.200	8.200	8.200	8.200	8.100	8.100
OCT	8.600	8.500	8.400	8.500	8.400	8.400
NOV	9.100	!SM	.	.	8.400	8.800
DEC	8.550	8.500	8.650	8.400	8.650	8.450
SODIUM (MG/L)			DET'N LIMIT = .200		GUIDELINE = 200. (C3)	
JAN	12.600	12.400	13.200	12.300	12.700	12.700
FEB	14.700	14.700	14.800	14.700	15.200	14.900
MAR	14.500	14.700	14.500	14.200	14.500	14.400
APR	14.200	14.600	14.600	14.300	14.800	15.000
MAY	13.200	13.400	14.200	13.600	14.200	14.400
JUN	12.400	!RE	13.200	13.000	13.800	13.600
JUL	12.200	12.200	12.600	12.200	12.600	12.600
AUG	13.800	13.600	14.000	14.000	12.400	12.400
SEP	11.800	12.000	12.400	12.200	12.200	12.200
OCT	13.000	12.800	12.800	12.600	12.800	12.600
NOV	12.600	!SM	.	.	12.400	12.800
DEC	12.800	13.100	13.000	13.200	12.700	12.800
AMMONIUM TOTAL (MG/L)			DET'N LIMIT = 0.002		GUIDELINE = .05 (F2)	
JAN	.006 <T	.068	.260	.100	.040	.036
FEB	.018	.140	.230	.124	.110	.086
MAR	.048	.060	.206	.116	.056	.056
APR	.036	.038	.152	.040	.068	.058
MAY	.086	.058	.172	.052	.108	.088

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
SITE						
	RAW	TREATED	SITE 1		SITE 2	
TYPE			STANDING	FREE FLOW	STANDING	FREE FLOW
JUN	.132	!RE	.230	.124	.108	.110
JUL	.070	.054	.144	.084	.054	.046
AUG	.002 <T	.012	.002 <T	.008 <T	.028	.002 <T
SEP	.028	.116	.090	.092	.040	.012
OCT	.016	.174	.138	.144	.098	.076
NOV	.010	!SM	.	.	.152	.128
DEC	.016	.202	.188	.192	.160	.138
NITRITE (MG/L)			DET'N LIMIT = 0.001		GUIDELINE = 1.000 (A1)	
JAN	.001 <T	.001 <T	.010	.001 <T	.004 <T	.002 <T
FEB	.005	.001 <T	.010	.001 <T	.007	.003 <T
MAR	.008	.002 <T	.007	.002 <T	.003 <T	.002 <T
APR	.005	.001 <T	.007	.001 <T	.003 <T	.003 <T
MAY	.013	.001 <T	.011	.004 <T	.003 <T	.004 <T
JUN	.016	!RE	.015	.011	.010	.010
JUL	.059	BDL	.020	.002 <T	.029	.034
AUG	BDL	BDL	.740	.004 <T	.020	.043
SEP	.010	.004 <T	.032	.029	.082	.024
OCT	BDL	BDL	BDL	BDL	.027	.012
NOV	.001 <T	!SM	.	.	.010	.008
DEC	.005	.001 <T	.003 <T	.004 <T	.008	.003 <T
TOTAL NITRATES (MG/L)			DET'N LIMIT = .020		GUIDELINE = 10.000 (A1)	
JAN	.435	.440	.620	.445	.445	.465
FEB	.425	.440	.450	.435	.455	.470
MAR	.440	.425	.440	.430	.465	.460
APR	.400	.405	.420	.405	.450	.455
MAY	.395	.380	.435	.400	.400	.425
JUN	.180	!RE	.220	.210	.360	.360
JUL	.415	.350	.370	.375	.380	.380
AUG	.500	.440	1.020	.450	.360	.385
SEP	.210	.220	.290	.280	.330	.380
OCT	.470	.495	.495	.470	.580	.615
NOV	.370	!SM	.	.	.415	.425
DEC	.470	.480	.500	.495	.480	.485
NITROGEN TOT KJELD (MG/L)			DET'N LIMIT = .020		GUIDELINE = N/A	
JAN	.190	.250	1.710	.270	.280	.260
FEB	.220	.250	.450	.300	.210	.190
MAR	.200	.100	!CR	!CR	.240	.160
APR	.310	.220	.970	.220	.270	.270
MAY	.230	.210	.890 RVU	.210	.260	.230
JUN	.310	!RE	.320	.270	.110	.140
JUL	.170	.180	.550	.160	.200	.120

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
SITE						
	RAW	TREATED	SITE 1		SITE 2	
TYPE			STANDING	FREE FLOW	STANDING	FREE FLOW
AUG	.170	.190	.380	.180	.230	.190
SEP	.250	.280	.280	.280	.220	.190
OCT	.230	.310	.220	.250	.310	.290
NOV	.200	!SM	.	.	.320	.290
DEC	.200	.360	.340	.360	.350	.290
PH (DMSNLESS)			DET'N LIMIT = N/A		GUIDELINE = 6.5-8.5(A4)	
JAN	8.170	7.890	7.880	7.910	7.980	7.960
FEB	8.200	7.950	7.930	7.900	7.990	7.990
MAR	8.320	8.210	8.150	8.150	8.130	8.110
APR	8.270	7.750	8.320	8.370	8.350	8.360
MAY	8.350	8.050	8.010	8.060	8.080	8.100
JUN	8.520	!RE	8.150	8.180	8.170	8.160
JUL	8.070	7.920	7.940	7.920	7.990	7.980
AUG	8.210	7.950	7.920	7.990	8.000	8.030
SEP	8.340	8.100	8.090	8.090	8.140	8.160
OCT	8.270	8.110	8.110	8.130	8.190	8.230
NOV	8.180	!SM	.	.	8.130	8.090
DEC	8.320	8.300	8.210	8.310	8.230	8.280
PHOSPHORUS FIL REACT (MG/L)			DET'N LIMIT = .5UG/L		GUIDELINE = N/A	
JAN	.005	.002	.	.	.	.
FEB	.001 <T	.001 <T	.	.	.	.
MAR	.006	.003	.	.	.	.
APR	.002 <T	.002	.	.	.	.
MAY	.004	.001 <T	.	.	.	.
JUN	.008	!RE	.	.	.	.
JUL	.006	.001 <T	.	.	.	.
AUG	.006	.001 <T	.	.	.	.
SEP	BDL	BDL	.	.	.	.
OCT	BDL	BDL	.	.	.	.
NOV	.000 <T	!SM	.	.	.	.
DEC	.004	.002 <T	.	.	.	.
PHOSPHORUS TTL-UNFIL (MG/L)			DET'N LIMIT = .002		GUIDELINE = .40 (F2)	
JAN	.009 <T	.002 <T	.	.	.	.
FEB	.015	.005 <T	.	.	.	.
MAR	.021	.006 <T	.	.	.	.
APR	.021	.010	.	.	.	.
MAY	.011	.008 <T	.	.	.	.
JUN	.006 <T	!RE	.	.	.	.
JUL	.015	.006 <T	.	.	.	.
AUG	.011	.007 <T	.	.	.	.
SEP	.012	.006 <T	.	.	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
SITE TYPE	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
OCT	.010	.004 <T	.	.	.	.
NOV	.009 <T	!SM	.	.	.	.
DEC	.009 <T	.004 <T	.	.	.	.
RESIDUE (TOTAL) (MG/L)		DET'N LIMIT = 1.		GUIDELINE = 500. (A3)		
JAN	214 CRO	216 CRO	222 CRO	216 CRO	220 CRO	220 CRO
FEB	202	218 CRO	222 CRO	219 CRO	221 CRO	220 CRO
MAR	200	232 CRO	234 CRO	231 CRO	234 CRO	235 CRO
APR	240	228 CRO	231 CRO	227 CRO	231 CRO	231 CRO
MAY	220 CRO	226 CRO	228 CRO	226 CRO	228 CRO	229 CRO
JUN	206 CRO	!RE	215 CRO	212 CRO	226 CRO	227 CRO
JUL	217 CRO	218 CRO	219 CRO	218 CRO	220 CRO	220 CRO
AUG	219 CRO	226 CRO	230 CRO	226 CRO	222 CRO	221 CRO
SEP	201 CRO	204 CRO	206 CRO	205 CRO	210 CRO	209 CRO
OCT	217 CRO	217 CRO	217 CRO	216 CRO	218 CRO	217 CRO
NOV	208 CRO	!SM	.	.	214 CRO	214 CRO
DEC	214 CRO	216 CRO	218 CRO	217 CRO	218 CRO	220 CRO
TURBIDITY (FTU)		DET'N LIMIT = .02		GUIDELINE = 1.00 (A1)		
JAN	1.730	.570	1.460	.580	.220	.200
FEB	1.600	.100	.600	.300	.410	3.600
MAR	2.900	.520	!SM	!SM	.160	.190
APR	1.850	.180	.640	.200	.270	.210
MAY	.710	.240	.720	.260	.260	.250
JUN	.590	!RE	.490	.280	.310	.330
JUL	.620	.200	.440	.250	.360	.430
AUG	1.020	.140	.440	.140	.140	.130
SEP	.930	.170	.320	.310	.190	.180
OCT	.440	.030 <T	.350	.150	.080 <T	.080 <T
NOV	.610	!SM	.	.	.150	.150
DEC	.800	.130	.170	.160	.480	.160

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
SITE						
	RAW	TREATED	SITE 1		SITE 2	
TYPE			STANDING	FREE FLOW	STANDING	FREE FLOW
METALS						
ALUMINUM (MG/L)			DET'N LIMIT = .004	GUIDELINE = .10 (A4)		
JAN	.025	.053	.076	.050	BDL	.046
FEB	.032	.078	.099	.078	.040	.049
MAR	.069	.120	.100	.110	.061	.065
APR	.015	.130	.110	.110	.110	.100
MAY	.026	.150	.130	.120	.110	.110
JUN	.005	.330	.310	.330	.160	.180
JUL	.005	.110	.100	.100	.120	.110
AUG	.012	.078	.083	.084	.095	.091
SEP	.022	.200	.190	.190	.200	.210
OCT	.011	.078	.070	.069	.084	.075
NOV	.014	!SM	.	.	.110	.092
DEC	.014	.052	.100	.049	.065	.047
BARIUM (MG/L)			DET'N LIMIT = 0.001	GUIDELINE = 1.000 (A1)		
JAN	.021	.020	.020	.021	.005	.020
FEB	.021	.021	.021	.021	.018	.021
MAR	.022	.021	.021	.021	.019	.020
APR	.022	.021	.022	.021	.022	.021
MAY	.022	.022	.020	.019	.020	.019
JUN	.022	.022	.023	.023	.017	.022
JUL	.020	.019	.030	.019	.020	.020
AUG	.019	.019	.019	.019	.020	.020
SEP	.018	.018	.018	.018	.019	.019
OCT	.017	.017	.017	.017	.017	.018
NOV	.019	!SM	.	.	.018	.019
DEC	.017	.018	.018	.018	.018	.018
BORON (MG/L)			DET'N LIMIT = 0.01	GUIDELINE = 5.000 (A1)		
JAN	.020	.030	.050	.030	BDL	.030
FEB	.040	.030	.030	.030	.020	.030
MAR	.030	.030	.050	.030	.030	.030
APR	.030	.030	.050	.030	.040	.030
MAY	.020 <T	.040 <T	.030 <T	.030 <T	.030 <T	.020 <T
JUN	.020	.040	.010	.030	.030 <T	.030 <T
JUL	.020 <T	.030 <T	.030 <T	.020 <T	.030 <T	.020 <T
AUG	.030 <T	.040 <T	.050 <T	.030 <T	.020 <T	.010 <T
SEP	.020 <T	.020 <T	.010 <T	.020 <T	.020 <T	.020 <T
OCT	.020 <T	.010 <T	.020 <T	.020 <T	.020 <T	.020 <T
NOV	.037 <T	!SM	.	.	.053	.046 <T
DEC	.033 <T	.032 <T	.029 <T	.040 <T	.030 <T	.029 <T
BERYLLIUM (MG/L)			DET'N LIMIT = 0.001	GUIDELINE = .0002 (H)		
JAN	BDL	BDL	BDL	BDL	BDL	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
SITE						
	RAW	TREATED	SITE 1		SITE 2	
TYPE			STANDING	FREE FLOW	STANDING	FREE FLOW
FEB	BDL	BDL	BDL	BDL	BDL	BDL
MAR	BDL	BDL	BDL	BDL	BDL	BDL
APR	BDL	BDL	BDL	BDL	BDL	BDL
MAY	BDL	BDL	BDL	BDL	BDL	BDL
JUN	BDL	BDL	BDL	BDL	BDL	BDL
JUL	BDL	BDL	BDL	BDL	BDL	BDL
AUG	BDL	BDL	BDL	BDL	BDL	BDL
SEP	BDL	BDL	BDL	BDL	BDL	BDL
OCT	BDL	BDL	BDL	BDL	BDL	BDL
NOV	.001	!SM	.	.	BDL	BDL
DEC	BDL	BDL	BDL	BDL	BDL	BDL
CADMIUM (UG/L)			DET'N LIMIT = 0.300		GUIDELINE = 5.000 (A1)	
JAN	BDL	BDL	1.000	BDL	BDL	BDL
FEB	BDL	BDL	BDL	BDL	BDL	BDL
MAR	BDL	BDL	BDL	BDL	BDL	BDL
APR	BDL	BDL	BDL	BDL	BDL	BDL
MAY	BDL	BDL	.900	BDL	BDL	BDL
JUN	BDL	BDL	BDL	BDL	BDL	BDL
JUL	BDL	BDL	BDL	BDL	BDL	BDL
AUG	BDL	BDL	.900	BDL	BDL	BDL
SEP	BDL	BDL	BDL	BDL	BDL	BDL
OCT	.400	BDL	BDL	BDL	BDL	BDL
NOV	.300	!SM	.	.	BDL	BDL
DEC	BDL	BDL	BDL	BDL	BDL	BDL
COBALT (MG/L)			DET'N LIMIT = 0.001		GUIDELINE = 1.0 (H)	
JAN	BDL	BDL	BDL	BDL	BDL	BDL
FEB	BDL	BDL	BDL	BDL	BDL	BDL
MAR	BDL	BDL	BDL	BDL	BDL	BDL
APR	BDL	BDL	BDL	BDL	BDL	BDL
MAY	.002	.002	BDL	BDL	BDL	BDL
JUN	BDL	BDL	BDL	BDL	BDL	.002
JUL	BDL	BDL	BDL	BDL	BDL	BDL
AUG	BDL	BDL	BDL	BDL	BDL	BDL
SEP	BDL	BDL	BDL	BDL	BDL	BDL
OCT	BDL	BDL	BDL	BDL	BDL	BDL
NOV	.001	!SM	.	.	BDL	BDL
DEC	BDL	BDL	BDL	BDL	BDL	BDL
CHROMIUM (MG/L)			DET'N LIMIT = 0.001		GUIDELINE = .05 (A1)	
JAN	.001	BDL	.001	BDL	BDL	.001
FEB	BDL	.001	.001	.001	BDL	BDL
MAR	BDL	BDL	BDL	BDL	BDL	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
SITE						
	RAW	TREATED	SITE 1		SITE 2	
TYPE						
			STANDING	FREE FLOW	STANDING	FREE FLOW
APR	BDL	BDL	.001	.001	.001	.001
MAY	.001	.001	BDL	BDL	BDL	BDL
JUN	BDL	BDL	BDL	.001	.001	.002
JUL	BDL	BDL	BDL	BDL	BDL	BDL
AUG	BDL	.001	.001	.001	BDL	.001
SEP	.002	.001	.002	.001	.002	.002
OCT	.001	.002	.001	.002	.002	.002
NOV	.002	!SM	.	.	.002	.002
DEC	.001	.002	.002	.002	.002	.002
COPPER (MG/L)			DET'N LIMIT = .001		GUIDELINE = 1.0 (A3)	
JAN	.005	.001	.036	.002	.130	.024
FEB	.001	.001	.019	.002	.670	.030
MAR	.002	.001	.010	.002	.040	.023
APR	.001	BDL	.012	.001	.450	.023
MAY	.001	.001	.016	.002	.240	.019
JUN	.002	.001	.010	.002	.034	.012
JUL	.003	.001	.018	.003	.220	.035
AUG	BDL	BDL	.013	.002	.250	.049
SEP	.001	BDL	.003	.002	.120	.019
OCT	.002	.002	.006	.002	.280	.036
NOV	.001	!SM	.	.	.300	.032
DEC	.003	BDL	.028	.002	.400	.024
IRON (MG/L)			DET'N LIMIT = .002		GUIDELINE = .300 (A3)	
JAN	.032	.006	.080	.035	BDL	.008
FEB	.033	.009	.035	.059	.005	.005
MAR	.089	.024	.062	.074	.005	.005
APR	.043	.006	.052	.060	.008	.010
MAY	.052	.006	.066	.062	BDL	BDL
JUN	.014	.004	.058	.060	.009	.011
JUL	.063	.040	.140	.044	.038	.025
AUG	.072	.008	.057	.062	.006	.005
SEP	.024	.074	.100	.069	.700	.038
OCT	.070	.039	.032	.054	.004	.022
NOV	.013	!SM	.	.	BDL	.004
DEC	.015	.033	.110	.056	.025	.008
MERCURY (UG/L)			DET'N LIMIT = 0.010		GUIDELINE = 1.000 (A1)	
JAN	.010	.010	.	.020	.	.010
FEB	.020	.010	.	.020	.	.010
MAR	BDL	BDL	.	.020	.	.010
APR	.020	.020	.	.030	.	.020
MAY	.030	.030	.	.040	.	.020

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
SITE						
	RAW	TREATED	SITE 1		SITE 2	
TYPE			STANDING	FREE FLOW	STANDING	FREE FLOW
JUN	.030	.030	.	.040	.	.040
JUL	.050	.050	.	.070	.	.030
AUG	.040	.050	.	.100	.	.030
SEP	.050	.050	.	.080	.	.020
OCT	.040	.040	.	.090	.	.030
NOV	.050	!SS	.	.	.	.040
DEC	.050	.060	.	.130	.	.030
MANGANESE (MG/L)			DET'N LIMIT = .001		GUIDELINE = .050 (A3)	
JAN	.003	BDL	.003	.002	BDL	.001
FEB	.004	BDL	.002	.002	.001	.001
MAR	.005	.001	.003	.003	.001	BDL
APR	.006	.001	.003	.003	.001	.001
MAY	.007	.001	.004	.003	.001	.001
JUN	.003	.001	.003	.003	.003	.003
JUL	.011	.001	.003	.003	.001	.001
AUG	.005	.001	.004	.003	.001	.001
SEP	.006	.002	.006	.005	.004	.002
OCT	.003	.001	.003	.003	.001	.001
NOV	.002	!SM	.	.	.002	.001
DEC	.003	.002	.003	.003	.002	.001
MOLYBDENUM (MG/L)			DET'N LIMIT = 0.001		GUIDELINE = .50 (H)	
JAN	.001	.001	.001	.001	.001	.001
FEB	.001	.001	.001	.001	.001	.001
MAR	.001	.001	.001	.001	.001	.001
APR	.001	.001	.001	.001	.001	.001
MAY	.001	.001	.001	.001	.001	.001
JUN	.001	.001	.001	.001	.001	.001
JUL	.001	.001	.001	.001	.001	.001
AUG	BDL	.001	BDL	BDL	.001	BDL
SEP	.001	.001	.002	.002	.001	.001
OCT	BDL	BDL	BDL	BDL	.001	.001
NOV	.001	!SM	.	.	BDL	BDL
DEC	.001	.001	.001	.001	BDL	.001
NICKEL (MG/L)			DET'N LIMIT = 0.001		GUIDELINE = .05 (F3)	
JAN	BDL	BDL	.004	BDL	BDL	BDL
FEB	.002	BDL	.002	BDL	BDL	BDL
MAR	.002	BDL	.002	BDL	BDL	BDL
APR	BDL	BDL	.002	BDL	.002	BDL
MAY	.002	.069	.006	.002	BDL	.002
JUN	BDL	BDL	.002	BDL	BDL	BDL
JUL	.002	BDL	.002	.002	.002	.002

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
SITE						
	RAW	TREATED	SITE 1		SITE 2	
TYPE						
			STANDING	FREE FLOW	STANDING	FREE FLOW
AUG	BDL	.002	.002	BDL	BDL	.002
SEP	.005	.001	.008	BDL	BDL	.001
OCT	.006	.004	BDL	.002	.002	.008
NOV	.002	!SM	.	.	.002	.002
DEC	.001	.002	.006	.001	.002	.002
LEAD (MG/L)			DET'N LIMIT = 0.003		GUIDELINE = .050 (A1)	
JAN	BDL	BDL	BDL	BDL	.007	BDL
FEB	BDL	BDL	BDL	BDL	.016	BDL
MAR	BDL	BDL	BDL	BDL	BDL	BDL
APR	BDL	BDL	BDL	BDL	.009	BDL
MAY	.010	.010	BDL	BDL	BDL	BDL
JUN	BDL	BDL	BDL	BDL	.007	.014
JUL	BDL	BDL	BDL	BDL	.003	BDL
AUG	BDL	BDL	.005	.004	.007	.005
SEP	BDL	BDL	BDL	BDL	.005	BDL
OCT	.004	BDL	.028	BDL	.006	BDL
NOV	.003	!SM	.	.	.006	BDL
DEC	BDL	BDL	BDL	BDL	.006	BDL
STRONTIUM (MG/L)			DET'N LIMIT = .001		GUIDELINE = 2.00 (H)	
JAN	.170	.170	.170	.180	.062	.170
FEB	.170	.170	.170	.170	.150	.180
MAR	.180	.180	.180	.180	.170	.170
APR	.180	.180	.180	.180	.190	.180
MAY	.190	.190	.170	.170	.170	.170
JUN	.180	.180	.180	.180	.130	.180
JUL	.160	.160	.160	.160	.160	.160
AUG	.160	.160	.160	.160	.170	.160
SEP	.160	.160	.160	.150	.160	.160
OCT	.150	.150	.150	.150	.150	.150
NOV	.160	!SM	.	.	.150	.160
DEC	.150	.160	.160	.160	.160	.160
URANIUM (UG/L)			DET'N LIMIT = .02		GUIDELINE = 20. (A2)	
JAN	.460	.450	.450	.440	BDL	.460
FEB	.340	.320	.310	.320	.300	.300
MAR	.330	.370	.330	.360	.330	.320
APR	.330	.320	.340	.340	.350	.320
MAY	.300	.330	.340	.330	.330	.320
JUN	.270	.300	.330	.330	.110	.320
JUL	.320	.350	.330	.340	.310	.310
AUG	.020	.020	.030	.020	.290	.290
SEP	.300	.320	.340	.330	.290	.310

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
SITE						
	RAW	TREATED	SITE 1		SITE 2	
TYPE						
			STANDING	FREE FLOW	STANDING	FREE FLOW
OCT	.120	.410	.460	.460	.440	.410
NOV	!SM	!SM	.	.	!SM	!SM
DEC	.350	.350	.370	.380	.330	.360
VANADIUM (MG/L)			DET'N LIMIT = .001		GUIDELINE = .10 (H)	
JAN	BDL	BDL	BDL	BDL	BDL	BDL
FEB	BDL	BDL	BDL	BDL	BDL	BDL
MAR	BDL	BDL	BDL	BDL	BDL	BDL
APR	BDL	BDL	BDL	BDL	.001	BDL
MAY	BDL	BDL	BDL	BDL	BDL	BDL
JUN	BDL	BDL	BDL	BDL	.001	BDL
JUL	BDL	BDL	BDL	BDL	BDL	BDL
AUG	BDL	BDL	BDL	BDL	BDL	.001
SEP	BDL	BDL	BDL	BDL	.002	.002
OCT	BDL	BDL	BDL	BDL	BDL	BDL
NOV	.001	!SM	.	.	BDL	.002
DEC	BDL	BDL	BDL	BDL	BDL	BDL
ZINC (MG/L)			DET'N LIMIT = .001		GUIDELINE = 5.00 (A3)	
JAN	.002	.001	.051	.004	.007	.002
FEB	.002	.001	.026	.006	.035	.001
MAR	.002	BDL	.009	.004	.003	.003
APR	.002	.001	.036	BDL	.022	.001
MAY	.036	.022	.036	.002	.009	.002
JUN	.003	.002	.027	.015	.005	.001
JUL	.003	.001	.032	.001	.016	.002
AUG	.003	.002	.029	.003	.023	.003
SEP	BDL	BDL	.016	BDL	.010	BDL
OCT	.004	BDL	.003	BDL	.012	.004
NOV	.002	!SM	.	.	.013	BDL
DEC	.002	.001	.009	.002	.012	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
SITE			SITE 1		SITE 2	
TYPE	RAW	TREATED	STANDING	FREE FLOW	STANDING	FREE FLOW
CHLOROAROMATICS						
HEXACHLOROBUTADIENE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 450. (D4)		
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	!LA	.	BDL
JUL	BDL	BDL	.	1.000 <T	.	BDL
AUG	BDL	1.000 <T	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	!LA
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	!IS	.	.	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
123 TRICHLOROBENZENE (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = 10000. (I)		
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	30.000 <T	.	!LA	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	!LA
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	!IS	.	.	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
1234 T-CHLOROBENZENE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 10000. (I)		
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	3.000 <T	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	!LA	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	!LA
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	!IS	.	.	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
124 TRICHLOROBENZENE (NG/L)		DET'N LIMIT = 5.000		GUIDELINE = 10000. (I)		
JAN	BDL	BDL	.	BDL	.	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

SITE	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
			SITE 1		SITE 2	
TYPE	RAW	TREATED	STANDING	FREE FLOW	STANDING	FREE FLOW
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	5.000 <T	8.000 <T	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	!LA	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	!LA
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	!IS	.	.	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
HEXACHLOROETHANE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 1900. (D4)		
JAN	BDL	7.000 <T	.	5.000 <T	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	4.000 <T	.	BDL	.	4.000 <T
APR	BDL	3.000 <T	.	6.000 <T	.	3.000 <T
MAY	BDL	BDL	.	BDL	.	2.000 <T
JUN	BDL	3.000 <T	.	!LA	.	BDL
JUL	BDL	BDL	.	3.000 <T	.	3.000 <T
AUG	BDL	4.000 <T	.	4.000 <T	.	8.000 <T
SEP	BDL	BDL	.	BDL	.	!LA
OCT	BDL	15.000	.	BDL	.	BDL
NOV	BDL	!IS	.	.	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
SITE TYPE	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
PAH BENZO (A) PYRENE (NG/L)			DET'N LIMIT = 0		GUIDELINE = 10 (B1)	
SEP	BDL	BDL	.	.	.	.
OCT	5.000	BDL	.	.	.	.
NOV	BDL	!NR	.	.	.	.
DEC	5.000	BDL	.	.	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
SITE			SITE 1		SITE 2	
TYPE	RAW	TREATED	STANDING	FREE FLOW	STANDING	FREE FLOW
PESTICIDES & PCB						
ALPHA BHC (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 700. (G)		
JAN	2.000 <T	2.000 <T	.	3.000 <T	.	2.000 <T
FEB	2.000 <T	2.000 <T	.	3.000 <T	.	5.000 <T
MAR	6.000 <T	3.000 <T	.	2.000 <T	.	3.000 <T
APR	3.000 <T	3.000 <T	.	3.000 <T	.	3.000 <T
MAY	2.000 <T	3.000 <T	.	2.000 <T	.	3.000 <T
JUN	3.000 <T	3.000 <T	.	!LA	.	2.000 <T
JUL	2.000 <T	BDL	.	2.000 <T	.	3.000 <T
AUG	2.000 <T	4.000 <T	.	4.000 <T	.	2.000 <T
SEP	2.000 <T	3.000 <T	.	BDL	.	!LA
OCT	BDL	2.000 <T	.	2.000 <T	.	1.000 <T
NOV	2.000 <T	!IS	.	.	.	1.000 <T
DEC	3.000 <T	3.000 <T	.	3.000 <T	.	3.000 <T
BETA BHC (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 300. (G)		
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	!LA	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	!LA
OCT	BDL	BDL	.	2.000 <T	.	BDL
NOV	BDL	!IS	.	.	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
LINDANE (NG/L)		DET'N LIMIT = 1.000		GUIDELINE = 4000.0 (A1)		
JAN	BDL	BDL	.	1.000 <T	.	BDL
FEB	BDL	1.000 <T	.	1.000 <T	.	2.000 <T
MAR	2.000 <T	2.000 <T	.	1.000 <T	.	2.000 <T
APR	BDL	3.000 <T	.	1.000 <T	.	BDL
MAY	BDL	1.000 <T	.	1.000 <T	.	2.000 <T
JUN	1.000 <T	2.000 <T	.	!LA	.	1.000 <T
JUL	BDL	BDL	.	BDL	.	1.000 <T
AUG	1.000 <T	1.000 <T	.	2.000 <T	.	BDL
SEP	BDL	BDL	.	BDL	.	!LA
OCT	BDL	1.000 <T	.	1.000 <T	.	BDL
NOV	BDL	!IS	.	.	.	BDL
DEC	1.000 <T	1.000 <T	.	1.000 <T	.	1.000 <T

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
SITE						
	RAW	TREATED	SITE 1		SITE 2	
TYPE			STANDING	FREE FLOW	STANDING	FREE FLOW
PHENOLICS						
PHENOL (UG/L)			DET'N LIMIT = 0.2		GUIDELINE = 2.00 (A3)	
JAN	.400 <T	.200 <T	.	.	.	.
FEB	BDL	BDL	.	.	.	.
MAR	.600 <T	.400 <T	.	.	.	.
APR	BDL	BDL	.	.	.	.
MAY	.200 <T	.200 <T	.	.	.	.
JUN	.800 <T	.600 <T	.	.	.	.
JUL	BDL	BDL	.	.	.	.
AUG	BDL	BDL	.	.	.	.
SEP	.400 <T	.400 <T	.	.	.	.
OCT	.800 <T	.800 <T	.	.	.	.
NOV	BDL	!NR	.	.	.	.
DEC	BDL	BDL	.	.	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
SITE			SITE 1		SITE 2	
TYPE	RAW	TREATED	STANDING	FREE FLOW	STANDING	FREE FLOW
SPECIFIC PESTICIDES						
ATRAZINE (NG/L)			DET'N LIMIT = 50.00		GUIDELINE = 60000. (B3)	
JAN	370.000 <T	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	.	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
BLADEX (NG/L)			DET'N LIMIT = 100.00		GUIDELINE = 10000. (B3)	
JAN	5450.000	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	.	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
PROMETONE (NG/L)			DET'N LIMIT = 50.00		GUIDELINE = 52500. (D3)	
JAN	1460.000	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	.	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
PROPAZINE (NG/L)			DET'N LIMIT = 50.00		GUIDELINE = 16000. (D2)	
JAN	130.000 <T	BDL	.	BDL	.	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
SITE			SITE 1		SITE 2	
TYPE	RAW	TREATED	STANDING	FREE FLOW	STANDING	FREE FLOW
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	.	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
SIMAZINE (NG/L)			DET'N LIMIT = 50.00		GUIDELINE = 10000. (B3)	
JAN	860.000	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	.	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
SITE TYPE	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
VOLATILES						
BENZENE (UG/L)			DET'N LIMIT = 0	GUIDELINE = 5.0 (D1)		
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	!BT	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	!RE	.	BDL	.	BDL
NOV	BDL	!SM	.	.	.	BDL
DEC	BDL	BDL	.	.050 <T	.	BDL
TOLUENE (UG/L)			DET'N LIMIT = 0	GUIDELINE = 100.0 (G)		
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	!BT	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	!RE	.	.300 <T	.	.050 <T
NOV	.100 UCS	!SM	.	.	.	.050 UCS
DEC	BDL	BDL	.	.050 <T	.	BDL
ETHYLBENZENE (UG/L)			DET'N LIMIT = 0	GUIDELINE = 3400. (D3)		
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	.150 <T	.	BDL
AUG	BDL	!BT	.	BDL	.	BDL
SEP	BDL	.100 <T	.	.100 <T	.	BDL
OCT	BDL	!RE	.	.100 <T	.	BDL
NOV	BDL	!SM	.	.	.	BDL
DEC	BDL	BDL	.	.050 <T	.	BDL
P-XYLENE (UG/L)			DET'N LIMIT = 0	GUIDELINE = 620. (G)		
JAN	BDL	BDL	.	BDL	.	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
SITE			SITE 1		SITE 2	
TYPE	RAW	TREATED	STANDING	FREE FLOW	STANDING	FREE FLOW
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	!BT	.	BDL	.	BDL
SEP	BDL	BDL	.	.000 RMP	.	BDL
OCT	BDL	!RE	.	.000 RMP	.	BDL
NOV	BDL	!SM	.	.	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
M-XYLENE (UG/L)			DET'N LIMIT = 0	GUIDELINE = 620. (G)		
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	!BT	.	BDL	.	BDL
SEP	BDL	BDL	.	.200 <T	.	BDL
OCT	BDL	!RE	.	.100 <T	.	BDL
NOV	BDL	!SM	.	.	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
O-XYLENE (UG/L)			DET'N LIMIT = 0	GUIDELINE = 620. (G)		
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	!BT	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	!RE	.	.050 <T	.	BDL
NOV	BDL	!SM	.	.	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
CHLOROFORM (UG/L)			DET'N LIMIT = 0	GUIDELINE = 350.0 (A1+)		
JAN	BDL	8.000	.	7.000	.	8.000
FEB	BDL	7.000	.	7.000	.	8.000
MAR	BDL	14.000	.	13.000	.	12.000

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
SITE TYPE	RAW	TREATED	SITE 1		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW
APR	BDL	11.000	.	12.000	.	12.000
MAY	BDL	9.800	.	9.000	.	11.700
JUN	BDL	21.500	.	18.400	.	17.200
JUL	BDL	11.400	.	10.100	.	13.600
AUG	BDL	!BT	.	9.700	.	12.800
SEP	BDL	12.900	.	13.600	.	15.900
OCT	BDL	!RE	.	10.100	.	9.600
NOV	BDL	!SM	.	.	.	9.700
DEC	BDL	9.500	.	9.600	.	9.000
DICHLOROBROMOMETHANE (UG/L)			DET'N LIMIT = 0		GUIDELINE = 350.0 (A1+)	
JAN	BDL	7.000	.	7.000	.	8.000
FEB	BDL	7.000	.	7.000	.	7.000
MAR	BDL	10.000	.	9.000	.	8.000
APR	BDL	8.000	.	9.000	.	9.000
MAY	BDL	7.650	.	7.300	.	8.600
JUN	BDL	9.400	.	8.900	.	9.200
JUL	BDL	8.400	.	7.300	.	8.700
AUG	BDL	!BT	.	8.500	.	9.600
SEP	BDL	8.400	.	8.700	.	9.400
OCT	BDL	!RE	.	9.300	.	8.700
NOV	BDL	!SM	.	.	.	8.500
DEC	BDL	8.400	.	8.600	.	8.500
CHLORODIBROMOMETHANE (UG/L)			DET'N LIMIT = 0		GUIDELINE = 350.0 (A1+)	
JAN	BDL	4.000	.	4.000	.	5.000
FEB	BDL	3.000	.	4.000	.	4.000
MAR	BDL	5.000	.	4.000	.	6.000
APR	BDL	4.000	.	2.000	.	4.000
MAY	BDL	3.600	.	3.400	.	4.100
JUN	BDL	4.200	.	4.200	.	4.600
JUL	BDL	3.500	.	3.100	.	3.900
AUG	BDL	!BT	.	4.100	.	4.200
SEP	BDL	4.100	.	4.500	.	6.700
OCT	BDL	!RE	.	4.800	.	4.400
NOV	BDL	!SM	.	.	.	4.100
DEC	BDL	4.800	.	4.500	.	4.300
BROMOFORM (UG/L)			DET'N LIMIT = 0		GUIDELINE = 350.0 (A1+)	
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
SITE			SITE 1		SITE 2	
TYPE	RAW	TREATED	STANDING	FREE FLOW	STANDING	FREE FLOW
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	!BT	.	BDL	.	BDL
SEP	BDL	.400 <T	.	.400 <T	.	.400 <T
OCT	BDL	!RE	.	.400 <T	.	.400 <T
NOV	BDL	!SM	.	.	.	.400 <T
DEC	BDL	BDL	.	BDL	.	BDL
1,2 DICHLOROBENZENE (UG/L)		DET'N LIMIT = 0		GUIDELINE = 130. (G)		
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	BDL
APR	BDL	.000	.	.000	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	BDL	.	BDL
AUG	BDL	!BT	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	!RE	.	BDL	.	BDL
NOV	BDL	!SM	.	.	.	BDL
DEC	BDL	BDL	.	BDL	.	BDL
TOTL TRIHALOMETHANES (UG/L)		DET'N LIMIT = 0		GUIDELINE = 350.0 (A1)		
JAN	BDL	19.000	.	18.000	.	21.000
FEB	BDL	17.000	.	18.000	.	19.000
MAR	BDL	29.000	.	26.000	.	26.000
APR	BDL	23.000	.	23.000	.	25.000
MAY	BDL	21.050	.	19.700	.	24.400
JUN	BDL	35.100	.	31.500	.	31.000
JUL	BDL	23.300	.	20.500	.	26.200
AUG	BDL	!BT	.	22.300	.	26.600
SEP	BDL	25.800	.	27.200	.	32.400
OCT	BDL	!RE	.	24.600	.	23.100
NOV	BDL	!SM	.	.	.	22.700
DEC	BDL	22.700	.	22.700	.	21.800

OFFLINE...

TABLE 6

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

COUNT OF PARAMETERS NOT FOUND ABOVE THE DETECTION LIMIT

SCAN	PARAMETER	ANALYSED	DETECTION LIMIT	GUIDELINE	
CHEMISTRY (LAB)	CYANIDE	47	0.001	.200 (A1)	MG/L
METALS	ARSENIC	70	0.001	.050 (A1)	MG/L
	CYANIDE	47	0.001	.200 (A1)	MG/L
	SELENIUM	70	0.001	.010 (A1)	MG/L
CHLOROAROMATICS	1235 T-CHLOROBENZENE	47	1.000	10000. (I)	NG/L
	1245 T-CHLOROBENZENE	47	1.000	38000. (D4)	NG/L
	135 TRICHLOROBENZENE	47	5.000	10000. (D4)	NG/L
	OCTACHLOROSTYRENE	47	1.000	N/A	NG/L
	PENTACHLOROBENZENE	47	1.000	74000. (D4)	NG/L
	236 TRICHLOROTOLUENE	47	5.000	N/A	NG/L
	245 TRICHLOROTOLUENE	47	5.000	N/A	NG/L
	26A TRICHLOROTOLUENE	47	5.000	N/A	NG/L
CHLOROPHENOLS	234 TRICHLOROPHENOL	4	50.	N/A	NG/L
	2345 T-CHLOROPHENOL	4	50.	N/A	NG/L
	2356 T-CHLOROPHENOL	4	50.	N/A	NG/L
	245-TRICHLOROPHENOL	4	50.	2600000(D4)	NG/L
	246-TRICHLOROPHENOL	4	50.	10000. (C1)	NG/L
	PENTACHLOROPHENOL	4	50.	10000. (C1)	NG/L
PAH	PHENANTHRENE	8	0	N/A	NG/L
	ANTHRACENE	8	0	N/A	NG/L
	FLUORANTHENE	8	0	42000 (D4)	NG/L
	PYRENE	8	0	N/A	NG/L
	BENZO(A)ANTHRACENE	8	0	N/A	NG/L
	CHRYSENE	8	0	N/A	NG/L
	DIMETH. BENZ(A)ANTHR	8	0	N/A	NG/L
	BENZO(E)PYRENE	8	0	N/A	NG/L
	BENZO(J) FLUORANTHEN	8	N/A	N/A	NG/L
	BENZO(B) FLUORANTHEN	8	0	N/A	NG/L
	PERYLENE	8	0	N/A	NG/L
	BENZO(K) FLUORANTHEN	8	N/A	N/A	NG/L
	BENZO(G,H,I) PERYLEN	8	0	N/A	NG/L
	DIBENZO(A,H) ANTHRAC	8	0	N/A	NG/L
	INDENO(1,2,3-C,D) PY	8	0	N/A	NG/L
	BENZO(B) CHRYSENE	8	0	N/A	NG/L
	ANTHANTHRENE	8	N/A	N/A	NG/L
	CORONENE	8	0	N/A	NG/L
PESTICIDES & PCB	ALDRIN	47	1.000	700.0 (A1)	NG/L
	ALPHA CHLORDANE	47	2.000	7000.0 (A1)	NG/L
	GAMMA CHLORDANE	47	2.000	7000.0 (A1)	NG/L
	DIELDRIN	47	2.000	700.0 (A1)	NG/L
	METHOXYCHLOR	47	5.000	100000.(A1)	NG/L
	THIODAN I	47	2.000	74000. (D4)	NG/L
	THIODAN II	47	4.000	74000. (D4)	NG/L
	ENDRIN	47	4.000	200.0 (A1)	NG/L
	THIODAN SULPHATE	47	4.000	N/A	NG/L
	HEPTACHLOR EPOXIDE	47	1.000	3000.0 (A1)	NG/L

TABLE 6

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

COUNT OF PARAMETERS NOT FOUND ABOVE THE DETECTION LIMIT

SCAN	PARAMETER	ANALYSED	DETECTION LIMIT	GUIDELINE	
PESTICIDES & PCB	HEPTACHLOR	47	1.000	3000.0 (A1)	NG/L
	MIREX	47	5.000	N/A	NG/L
	OXYCHLORDANE	47	2.000	N/A	NG/L
	OPDDT	47	5.000	30000. (A1)	NG/L
	PCB	47	20.000	3000. (A2)	NG/L
	PP-DDD	47	5.000	N/A	NG/L
	PPDDE	47	1.000	30000. (A1)	NG/L
	PPDDT	47	5.000	30000. (A1)	NG/L
	ATRATONE	47	50.	N/A	NG/L
	ALACHLOR	47	500.	35000. (D2)	NG/L
	ETHYLENE DIBROMIDE	47	0	50.0 (G)	UG/L
	HCB	47	1.000	10.0 (C1)	NG/L
SPECIFIC PESTICIDES	TOXAPHENE	47	N/A	5000. (A1)	NG/L
	AMETRYNE	47	50.00	300000.(D3)	NG/L
	PROMETRYNE	47	50.00	1000. (B3)	NG/L
	SENCOR	47	100.00	80000. (B2)	NG/L
	2,4,5-T	4	50.00	35000. (D2)	NG/L
	2,4-D	4	100.00	100000.(A1)	NG/L
	24DCHLRPHENOXYBUTYRC	4	200.00	18000. (B3)	NG/L
	2,4-DP	4	100.00	N/A	NG/L
	DICAMBA	4	100.00	87000. (B3)	NG/L
	PICHLORAM	4	100.00	2450000(D3)	NG/L
	SILVEX	4	50.00	10000. (A1)	NG/L
	DIAZINON	4	20.	14000. (A1)	NG/L
	DICHLOROVOS	4	20.	N/A	NG/L
	DURSBAN	4	20.	N/A	NG/L
	ETHION	4	20.	35000. (G)	NG/L
	GUTHION	4	N/A	N/A	NG/L
	MALATHION	4	20.	160000. (G)	NG/L
	MEVINPHOS	4	20.	N/A	NG/L
	METHYL PARATHION	4	50.	7000. (B3)	NG/L
	METHYLTRITHION	4	20.	N/A	NG/L
	PARATHION	4	20.	35000. (B1)	NG/L
	PHORATE	4	20.	35.0 (D2)	NG/L
	RELDAN	4	20.	N/A	NG/L
	RONNEL	4	20.	N/A	NG/L
	AMINOCARB	4	N/A	N/A	NG/L
	BENOMYL	4	N/A	N/A	NG/L
	BUX	4	2000.	N/A	NG/L
	CARBOFURAN	4	2000.	18000. (D3)	NG/L
	CIPC	4	2000.	350000. (G)	NG/L
	DIALLATE	4	2000.	30000. (H)	NG/L
	EPTAM	4	2000.	N/A	NG/L
	IPC	4	2000.	N/A	NG/L
	PROPOXUR	4	2000.	90000. (G)	NG/L
	SEVIN	4	200.	70000. (A1)	NG/L
	SUTAN	4	2000.	245000.(D3)	NG/L
	METOLACHLOR	47	500.	50000. (B3)	NG/L
VOLATILES	1,1 DICHLOROETHYLENE	47	0	7.0 (D1)	UG/L
	DICHLOROMETHANE	47	0	1750. (D3)	UG/L

TABLE 6

DRINKING WATER SURVEILLANCE PROGRAM HAMILTON WATER TREATMENT PLANT 1987

COUNT OF PARAMETERS NOT FOUND ABOVE THE DETECTION LIMIT

SCAN	PARAMETER	ANALYSED	DETECTION LIMIT	GUIDELINE	
VOLATILES	T1,2DICHLOROETHYLENE	47	0	350. (D3)	UG/L
	1,1 DICHLOROETHANE	47	0	N/A	UG/L
	111, TRICHLOROETHANE	47	0	200. (D1)	UG/L
	1,2 DICHLOROETHANE	47	0	5.0 (D1)	UG/L
	CARBON TETRACHLORIDE	47	0	5.0 (D1)	UG/L
	1,2 DICHLOROPROPANE	47	0	10.0 (G)	UG/L
	TRICHLOROETHYLENE	47	0	5.0 (D1)	UG/L
	112 TRICHLOROETHANE	47	0	.60 (D4)	UG/L
	T-CHLOROETHYLENE	47	0	10.0 (C2)	UG/L
	1122 T-CHLOROETHANE	47	0	0.17 (D4)	UG/L
	CHLOROBENZENE	47	0	1510. (D3)	UG/L
	1,4 DICHLOROBENZENE	47	0	75.0 (D1)	UG/L
	1,3 DICHLOROBENZENE	47	0	130. (G)	UG/L
	TRIFLUOROCHLOROTOLUE	47	0	N/A	UG/L
	ETHYLENE DIBROMIDE	47	0	50.0 (G)	UG/L

Appendix A

DRINKING WATER SURVEILLANCE PROGRAM

The Drinking Water Surveillance Program (DWSP) for Ontario monitors drinking water quality at municipal water supply systems. The DWSP Database Management System provides a computerized drinking water quality information system for the supplies monitored. The objectives of the program are to provide:

- immediate, reliable, current information on drinking water quality,
- a flagging mechanism for 'Objective' exceedence,
- a definition of contaminant levels and trends,
- a comprehensive background for remedial action,
- a framework for assessment of new contaminants,
- and an indication of treatment efficiency of plant processes.

Program

The DWSP officially began in April 1986 and is designed to eventually include all municipal water supplies in Ontario; currently 44 plants are being monitored. Water supply locations have been prioritized for surveillance, based primarily on criteria such as population density, probability of contamination and geographical location.

An ongoing assessment of future monitoring requirements at each location will be made. Monitoring will continue at the initial locations at an appropriate level and further locations will be phased into the program as resources permit. It is estimated that after 4 years of operation, the program will be monitoring 90 locations.

A major goal of the program is to collect valid water quality data, in context with plant operational characteristics at the time of sampling. As soon as sufficient data have been accumulated and analysed, both the frequency of sampling and the range of parameters may be adjusted accordingly.

Assessments are carried out at all locations prior to initial sampling in order to acquire complete plant process and distribution system details, and to designate (and retrofit if necessary) all sampling systems and locations. This ensures that the sampled water is a reflection of the water itself.

Samples are taken of the raw (ambient water) and the treated water at the treatment plant, and of consumer's tap water in the distribution system. In order to determine possible effects of distribution on water quality, both standing and free flow water in old and new sections of the distribution system are sampled.

Sampling is carried out by operational personnel who have been trained in the applicable procedures.

Comprehensive standardized procedures and Field Test kits are supplied to sampling personnel. This ensures that samples are taken and handled according to standard protocols and that field testing will supply reliable data. All field and laboratory analyses are carried out using "approved documented procedures". All laboratory analyses are carried out by the MOE Laboratory Services Branch.

Data Reporting Mechanism

When the analytical results are transferred from the MOE laboratory into the DWSP system, printouts of the completed analyses are sent to the MOE District Officer, the appropriate operational staff and are also retained by the DWSP co-ordinator.

DWSP INPUTS AND OUTPUTS

The DWSP INPUTS and OUTPUTS are illustrated in Fig. 1.

PROGRAM INPUTS

PLANT AND DISTRIBUTION SYSTEM DESCRIPTION

The system description includes plant specific non-analytical information acquired through a questionnaire and initial plant visit. During the initial assessment of the plant and distribution system the questionnaire content is verified and

missing information added. It is intended that all data be kept current with scheduled annual updates.

The PLANT and DISTRIBUTION SYSTEM DESCRIPTION consists of the following seven components.

1. Process component inventory

All physical and chemical processes that the water is subjected to, from the intake pipe to the consumers' tap (where possible), are documented. These include: process type, general description of physical structures, material types, sizes, and retention time for each process within the plant. The processes may be as simple as transmission or as complex as carbon adsorption.

2. Treatment chemicals

Chemicals used in the treatment processes, their function, application point, supplier and brand-name are recorded. The chemical dosages applied on the day of sampling are recorded in DWSP.

3. Process control measurements

Documentation of in-plant monitoring of process parameters (turbidity, chlorine residuals, pH, aluminum residuals) including methods used, monitoring locations and frequency is contained in this section. In-plant monitoring results are generally not retained in DWSP but are retained by the Water Treatment Plant.

4. Design flow and retention time

The hydraulic capacity, designed and actual, is noted here. Retention time (the time that a block of water is retained in the plant) is also noted. The maximum, minimum and average flow as well as a record of the flow rate on the day of sampling are recorded in DWSP.

5. Distribution system description

This area includes the storage and transmission characteristics of the distribution system after the water leaves the plant.

6. Sampling system

Each plant is assessed for its adequacy in terms of sampling of bacteriological, organic and inorganic parameters. The prime considerations in the assessment and design of the sampling system are:

i/ the sample is an accurate representation of the actual water condition, eg. raw water has had no chemical treatment;

ii/ the water being sampled is not being modified by the sampling system;

iii/ the sample tap must be in a clean area of the plant, preferably a lab area;

iv/ the sample lines must be organically inert (no plastic, ideally stainless steel).

It is imperative that the sampled water be a reflection not of the sampling system but of the water itself.

The sampling system documentation includes: origin of the water; date sampling was initiated; size, length and material type (intake, discharge and tap), pump characteristics (model, type, capacity) and flow rate.

7. People

This section contains the names, addresses and phone numbers of current plant management and operational staff, distribution system management and operational staff, Medical Officer of Health and appropriate Ministry of Environment personnel associated with the plant.

FIELD DATA

The second major input to DWSP is field data.

Field data is collected at the plant and from the distribution system sites on the day of sampling. The field data consists of general operating conditions and the results of testing for field parameters. General operating conditions include chemicals used, dosages, flow and retention time on the day of sampling as well as monthly maximum, minimum and average flows. Field parameters include turbidity, chlorine residuals (free,combined and total), temperature and pH. These parameters are analysed according to standardized DWSP protocols to allow for interplant comparison.

LABORATORY ANALYTICAL DATA

The third major input to DWSP is Laboratory Analytical Data.

Samples gathered from the raw, treated and distribution sampling sites are analyzed for approximately 160 parameters at a frequency of two to twelve times per year. Sixty-five percent of the parameters are organic. The parameters measured may have health or aesthetic implications when present in drinking water. Many of the parameters may be used in the treatment process or may be treatment by-products. Due to the nature of certain analytical instruments parameters may be measured for in a "scan" producing some results for parameters that are not on the DWSP priority list but which may be of interest. The majority of the parameters are measured on a routine basis however, those that are technically more difficult and/or costly to analyse for are done less frequently. These include Specific Pesticides and Chlorophenols.

Although the parameter list is extensive, additional parameters with the potential to cause health or aesthetic related problems may be added provided reliable analytical and sampling methods exist.

All laboratory generated data is derived from standardized, documented analytical protocols. The analytical method is an integral part of the data and as methods change notation will be made and intercomparison data documented.

PARAMETER REFERENCE INFORMATION

The fourth major input to DWSP is Parameter Reference Information

This is a catalogue of information for each substance analysed on DWSP. It includes parameter name and aliases, physical and chemical properties, basic toxicology, world-wide health limits, treatment methods and uses. The Parameter Reference Information is computerized and can be accessed through the Query function of the DWSP database.

An example is shown in fig. 2.

A written copy (hard version) of the Parameter Reference Information will be available in the near future and is a new and sophisticated enhancement to the DWSP.

PROGRAM OUTPUTS

There are four major program outputs, Query, Action Alert, Report Generation and the Annual Report.

QUERY

All DWSP information is easily accessed through the Query function, therefore anything from addresses of plant personnel to complete water quality information for a plant's water supply is instantly available. The DWSP computer system makes relatively complex inquiries manageable. A personal password allowing access into the DWSP query mode in all MOE offices is being developed by the DWSP group.

ACTION ALERTS

Drinking Water quality in Ontario is evaluated against provincial objectives as outlined in the publication, Ontario Drinking Water Objectives (ISBN 0-7729-2725-1 revised 1983). This publication contains health-related Maximum Acceptable Concentrations for thirty substances. Should the reported level of a substance in treated water exceed the Ontario Drinking Water Objective an "Action Alert" requiring resampling and confirmation is issued. This assures that operational staff, health authorities and the public are notified as soon as possible of confirmation of an exceedance and remedial action taken. This report supplies a history of the occurrence of past exceedences at the plant plus a historical summary on the parameter of concern.

In the absence of Ontario Drinking Water Objectives, other agency guidelines which are documented in the Parameter Reference Information may be used. If these guidelines are exceeded the results are flagged and evaluated by DWSP personnel. An "Action Alert" will be issued if warranted.

REPORT GENERATION

Custom reports can be generated from DWSP to meet the needs of the regions and to respond to public requests.

ANNUAL REPORTS

It is the practice of DWSP to produce an annual report containing analytical data along with companion plant information.

FIG. 1

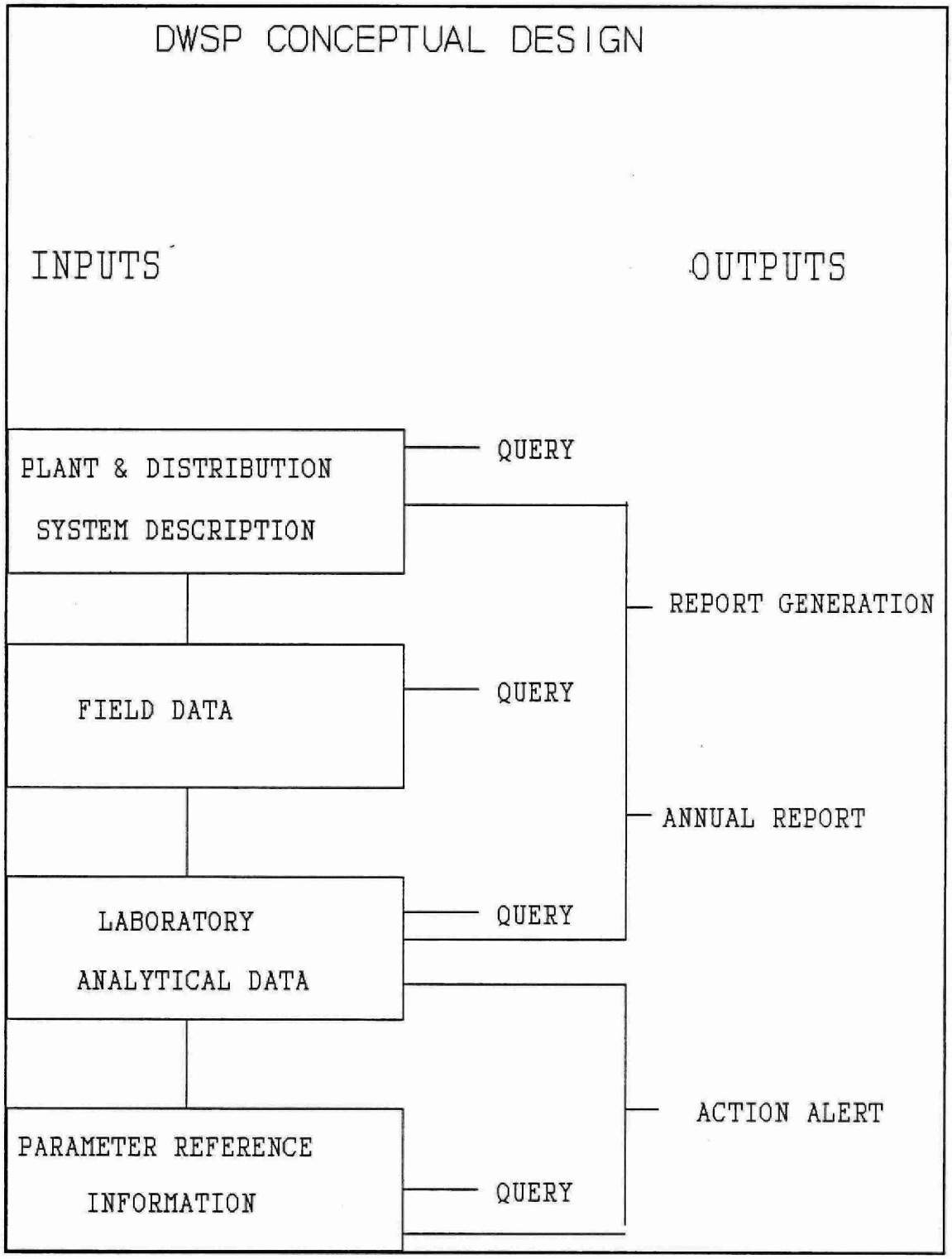

DWSP CONCEPTUAL DESIGN
INPUTS
OUTPUTS
PLANT & DISTRIBUTION SYSTEM DESCRIPTION
FIELD DATA
LABORATORY ANALYTICAL DATA
PARAMETER REFERENCE INFORMATION
QUERY
QUERY
QUERY
QUERY
REPORT GENERATION
ANNUAL REPORT
ACTION ALERT

FIG.2

MOE - DRINKING WATER ASSESSMENT PROGRAM (DWSP)

(B2001P) PARAMETER
REFERENCE
BENZENE

SOURCE	FROM	TO	METHOD	TARG	UNIT	NOTE
EPA	C 86/04		NOMETH	.00	063000 UG/L	RMCL
EPAA	C 80/11		NOMETH	6.60	063000 UG/L	
FERC	C 84/05		NOMETH	1.00	063000 UG/L	
WHO	C 84/01		NOMETH	10.00	064000 UG/L	

DESCRIPTION: NAME: BENZENE
CAS#: 71432
MOLECULAR FORMULAE: C_6H_6
DETECTION LIMIT: (FOR METHOD POCODO) 0.05 UG/L
SYNONYMS: BENZOLE, COAL NAPHTHA, CARBON OIL (27), CYCLOHEXATRIENE (41)
CHARACTERISTICS: COLOURLESS TO LIGHT YELLOW, MOBILE, NON-POLAR LIQUID, OF HIGHLY REFRACTIVE NATURE, AROMATIC, VAPOURS BURN WITH SMOKING FLAME (30)
PROPERTIES:
SOLUBILITY IN WATER: 1780-1800 MG/L AT 25 DEG C (41)
THRESHOLD ODOUR: NO DATA
THRESHOLD TASTE: 0.5 MG/L IN WATER (39)
ENVIRONMENTAL FATE: MAY BIOACCUMUALTE IN LIVING ORGANISMS, APPEARS TO BIOACCUMULATE IN ANIMAL TISSUES THAT EXHIBIT HIGH LIPID CONTENT OR ARE MAJOR METABOLIC SITES (LIVER, BRAIN), SMALL QUANITIES EVAPORATE FROM SOIL OR DEGRADE QUICKLY
SOURCES: PETROLEUM REFINING, SOLVENT RECOVERY, COAL T A R DISTILLATION, FOOD PROCESSING, TANNING.
USES: PREPERATION OF ETHYL BENZENE USED AS A STYRENE MONOMER, DETERGENTS, NYLON, AS INTERMEDIATE IN PESTICIDE PRODUCTION, SOLVENT IN RUBBER INDUSTRY, DEGREASING AND CLEANSING AGENT, GASOLINE.
TOXICITY: RATING 4 (VERY TOXIC); ACUTE - IRRITATES MUCOUS MEMBRANES, SYMPTONS INCLUDE RESTLESSNESS, CONVULSIONS, DEPRESSION, RESPIRATORY FAILURE; CHRONIC - ANEMIA AND LEUKEMIA (45).
CARINOGENICITY: HUMAN CARCINOGEN AND MUTAGEN
REMOVAL: GAC ADSORPTION, PRECIPITATION WITH ALUM FOLLOWED BY SEDIMENTATION, COAGULATION AND FLOCCULATION, SOLVENT EXTRACTION, OXIDATION (41).
MOLECULAR WEIGHT: 78.12 GRAMS
MELTING POINT: 5.5 DEGREES C (27)
BOILING POINT: 80.1 DEGREES C (27)
SPECIFIC GRAVITY: 0.879 AT 20 DEGREES C (27)
VAPOUR PRESSURE: 100 MM AT 26.1 DEGREES C
HENRY'S LAW CONSTANT: 0.00555 ATM M_3/MOLE
LOG OCT./WATER PAR.COEFF: K=1.0 1/N=1.6 R=.97 PH=5.3

Appendix B

DWSP SAMPLING GUIDELINE

i) RAW and TREATED at PLANT

General Chemistry	-500 mL clear plastic bottle -rinse bottle with sample three times and discard water -fill to line
Bacti	-250 mL clear glass bottle with white seal on cap -do not rinse bottle; preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL clear plastic bottle with white lid -rinse bottle and cap three times, discard -fill to line -add 10 drops nitric acid (**Caution:** HNO_3 is corrosive)
Volatiles (OPOPUP)	-250 mL clear glass bottle -do not rinse bottle -tilt bottle when filling -fill bottle completely; there should be no air bubbles.
Organic (OWOC),(OWTRI),(OAPAHX)	-1 liter brown glass bottle per scan -do not rinse bottle -fill to approx. 1" from top -when 'special pesticides' are requested three extra bottles per sample must be submitted
Cyanide	-500 mL clear plastic bottle -do not rinse bottle -fill to approx. 1" from top -add 10 drops sodium hydroxide (**Caution:** NaOH is corrosive)

Mercury	-250 mL clear glass bottle -rinse bottle and cap three times, discard then fill to top of label -add 20 drops each nitric acid and potassium dichromate (**Caution:** HNO_3 and $KCrO_7$ corrosive)
Phenols	-250 mL clear glass bottle -do <u>not</u> rinse bottle -fill to top of label as marked

<u>Steps</u>

1. Let cold water tap run for several minutes.
2. Record time in submission sheet.
3. Record teperature on submission sheet.
4. Fill up all bottles as per instructions.
5. Record chlorine residuals (free, combined and total for treated water only), turbidity and pH on submission sheet.

ii) Distribution Samples (standing water)

General Chemistry	-500 mL clear palstic bottle -rinse bottle with sample three times and discard -fill to line
Metals	-500 mL clear plastic bottle with white lid -rinse bottle and cap three times, discard -fill to line -add 10 drops nitric acid (**Caution:** HNO_3 is corrosive)

Steps:

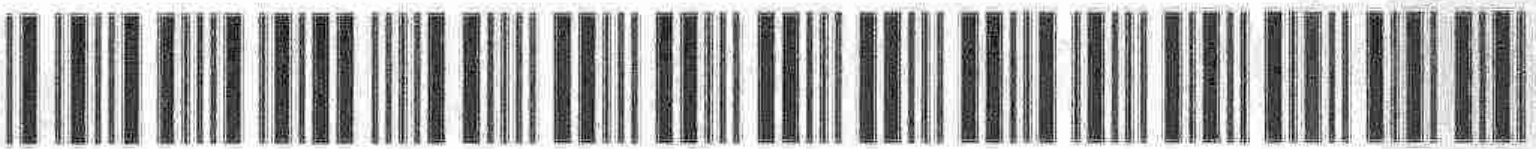
1. Record time on submission sheet.
2. Place bucket under tap and open cold water.
3. Fill to predetermined volume.
4. After mixing the water, record the temperature on the submission sheet.
5. Fill general chemistry and metals bottles.
6. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

iii) Distribution Samples (free flow)

General Chemistry	-500 mL clear plastic bottle -rinse bottle with sample three times and discard water -fill to line
Bacti	-250 mL clear glass bottle with white seal on cap -do <u>not</u> rinse bottle; preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL clear plastic bottle with white lid -rinse bottle and cap three times, discard -fill to line -add 10 drops nitric acid (**Caution:** HNO_3 is corrosive)
Volatiles (OPOPUP)	-250 mL clear glass bottle -do <u>not</u> rinse bottle; preservative has been added -tilt bottle when filling -fill bottle completely; there should be no air bubbles
Organic (OWOC),(OWTRI)	-1 liter brown glass bottle per scan -do <u>not</u> rinse bottle: preservative has been added -fill to approx. 1" from top
Cyanide	-500 mL clear plastic bottle -do <u>not</u> rinse bottle: preservative has been added -fill to approx. 1" from top -add 10 drops sodium hydroxide (**Caution:** NaOH is corrosive)
Mercury	-250 mL clear glass bottle -rinse bottle and cap three times, discard then fill to top of label -add 20 drops each nitric acid and potassium dichromate (**Caution:** HNO_3 and KCrO7 corrosive)

Steps:

1. Record time on submission sheet.
2. Let cold water flow for ten minutes.
3. Record temperature on submission sheet.
4. Fill all bottles as per instructions.
5. Record chlorine residuals (free, combined and total), tubidity and pH on submission sheet.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